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INDIA RUBBER WORLD

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Volume 93 | December 1, 1935 | Number 3

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Published monthly by Bill Brothers Publishing Corp., 420 Lexington Ave., New York, N. Y. Cable Address, ELBILL, New York. Subscription $3.00 per year postpaid in the United States and Mexico; $3.50 per year postpaid to Canada; $4.00 per year postpaid to all other countries.

Other Bill publications are: *Drapery Profits, Premium Practice, Rug Profits, Sales Management, Soda Fountain,* and *Tires.*

INDIA RUBBER WORLD

Published at 420 Lexington Avenue, New York, N. Y.

Volume 93 **New York, December 1, 1935** **Number 3**

Industrial Gas Masks

Rubber Plays an Important Role in Gas Mask Development and Production

F. Rutledge Davis [1]

THAT gas protective equipment has become an indispensable part of the warrior's equipment is a fact well known to the entire population of civilized countries. As a matter of fact the term "gas mask" to most persons implies something that is a part of and confined to modern warfare. That this is a popular misconception, however, is evidenced by the fact that gas masks of a variety of types are manufactured and utilized for strictly industrial purposes continuously.

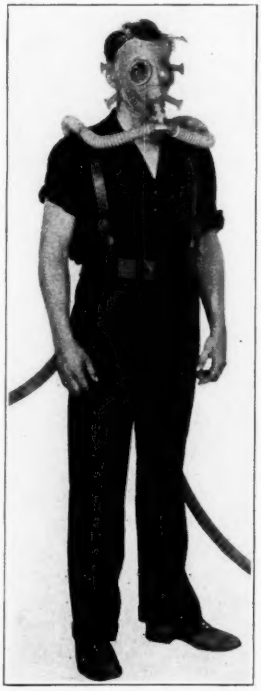


Fig 1. Davis Free-Air Type of Gas Mask

Safety, Comfort, Durability

The development and refinement of gas masks have involved the use of various materials fabricated in many ways to achieve ever-increasing degrees of safety, comfort, and usefulness under the specific conditions for which they are intended. The safety phase of early masks was greatly impaired as against those of today because of the lack of refinement of materials and of design that would assure the face piece forming a leakproof seal with the varied and irregular contours of human faces. Regardless of the efficacy of the neutralizing chemical contents of the canister, a mask that allows seepage of contaminated air beneath its marginal edges does not offer adequate protection to the wearer's respiratory organs. Likewise the light flexible breathing hose must be of such design and materials as to resist constriction, collapsing, or breaking; else the wearer is subjected to the exhausting hazards of impaired breathing, if not actually to the serious results of suffocation.

Fig. 2. Davis Body Canister Type of Gas Mask

Comfort of a gas mask comprehends the lightness and distribution of weight between head and body; the freedom of movement that is permitted; the ease with which the wearer can inhale and exhale; the provision that is incorporated to protect vision; the smooth and non-irritating feel of the contacting surfaces of the mask with the skin; and the lay and security of the head harness, which keeps the mask in place.

Durability or usefulness, while involving an important measure of safety, is chiefly concerned in industry with the cost of protection.

Service Test Methods

A vast difference in the formulation of rubber com-

[1] President of the Davis Emergency Equipment Co., Inc., 55 Van Dam St., New York, N. Y.

pounds is used in the molded rubber parts of the various gas protective devices available. Wise users will expose the molded rubber parts of masks to the actual conditions under which the masks will be used to determine their relative probable length of service.

A method of test such as prescribed by the U. S. Bureau of Mines for the hose of air line masks is quite simply performed in any laboratory and consists of immersing a length of hose in gasoline and blowing air through it. This air is tested for its gas content. The length of time for the gasoline to penetrate through various pieces of hose is taken as the relative service life in the petroleum industry. A hose through which gasoline penetrated in twelve hours may be expected to give twice the service of a hose through which the gasoline penetrated in six hours.

Other rubber parts of a mask can be subjected to similar conditions with suitable apparatus to effect their evaluation in service. Similarly tests may be made using the chemicals to the vapors of which the masks will be exposed, instead of gasoline.

The engineering departments of all the larger industries now test various rubber compounds for their relative service life under conditions to which they will be exposed in actual service in their industry. The molded rubber parts of gas masks on which men's lives may depend, are most certainly entitled to these same engineering tests.

Rubber and Gas Masks

Of all materials involved in the evolutionary stages of gas mask development none have met the varied and vital requirements as has rubber. In this most versatile material the native properties and attainable characteristics aline themselves coincidentally with the numerous and importantly particular requirements of these protective devices for human beings.

As a raw material, rubber permits of compounding to obtain almost any type of fabrication workability and at the same time a vast range of finished product characteristics. Both of these peculiarities are not only desirable but necessary in the manufacture of dependable and satisfactory gas mask parts. Most of these component parts are of weird and unusual shapes, fabricated with and without textiles, that tax the ingenuity of the most skilled rubber engineer to mold to the perfect finish and the precise dimensions required, and yet in the finished product each part must possess the proper flexibility, hardness, strength, immunity to the permeation of gases and solvents, and the trait of longevity that its particular function makes indispensable.

Face Piece

It must be kept constantly in mind that the vital part of any assembled piece of gas protective apparatus is every part. The face piece is by no means an exception, but its proper qualities are, perhaps, among the most difficult to obtain properly in manufacturing.

Here the flexibility of rubber plays a most important part; also its ability to stretch is most helpful in making the tight seal on irregular facial contours. Face pieces are reenforced with stockinette which adds to the strength of the rubber, but which still permits some slight stretching in one direction. Formerly this stockinette reenforcement was cemented to the face of sheet rubber. The sheet was died out into the proper shape to be made up into the finished face piece.

This cementing of the stockinette to the rubber, while quite satisfactory for army use, had a very serious defect when used in certain industries. In many industries, most notably the petroleum group, the gas of the gas-air mixture had a definite solvent effect on the rubber cement used to attach the stockinette to the sheet rubber. This solvent effect soon loosened the bond between stockinette and rubber so that the former ceased to fulfill its function as a reenforcement of the rubber. Further, men working in solvent liquids find it necessary to adjust their masks. Their hands wet with such liquid saturate the stockinette on the outside of the mask, thus not only breaking the bond between stockinette and rubber, but also tending to soak into the rubber itself, thereby shortening the useful life of the face piece.

The first step to remedy this defect was taken by A. E. Davidson, of the Protecto Safety Appliance Co., now absorbed by the Davis Emergency Equipment Co., in about 1923. The improvement consisted of molding each face piece separately and placing a piece of stockinette in the mold with a sheet of rubber. When pressure was applied on the mold, the rubber was forced through the mesh of the stockinette. The finished product, therefore, appeared with the stockinette as an integral part of the rubber face piece. The U. S. Army later adopted this construction for their face pieces.

While this construction proved of marked advantage over the cement bond, all the threads were not covered; so the difficulty of these threads becoming saturated with some solvent still remained to cause deterioration of the rubber.

In about 1927 the Davis company, in conjunction with the Diamond Rubber Co., developed what is now recog-

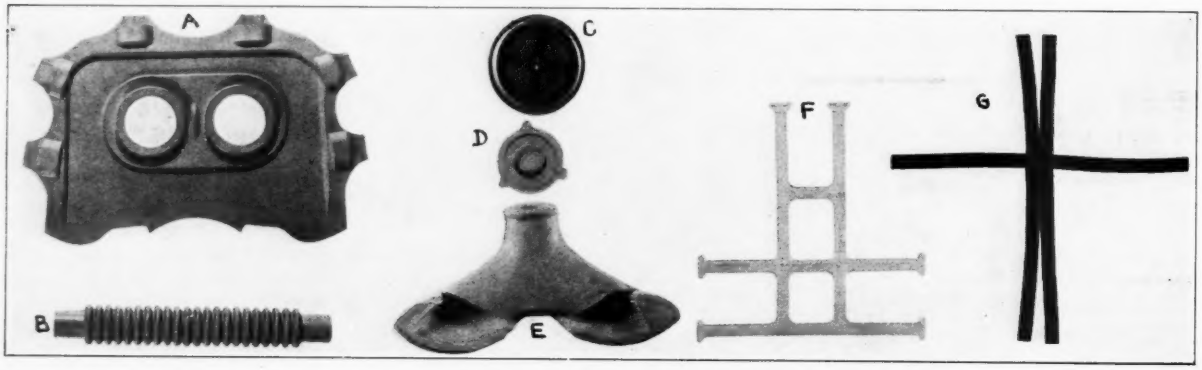


Fig. 3. Rubber Parts of Davis Gas Mask

A. Stockinette Inserted Molded Rubber Face Piece; B. Molded Connection Hose Designed to Prevent Collapse or Constriction; C. Canister Check Valve; D. Exhale Valve; E. Clarifying Tube; F. One-Piece Molded Rubber Head Harness; G. Obsolete Garter Elastic-Type Sewn Head Harness

nized as standard face piece construction. Instead of using a single sheet of rubber with the stockinette molded on the outside, two thinner sheets of calendered rubber were used with frictioned stockinette between. Thus the reenforcing quality of the stockinette was retained, but it was no longer exposed. The result was an all-rubber surface, outside as well as inside, with no exposed fabric. Masks could now be easily cleaned of any material which would tend to cause the rubber to deteriorate.

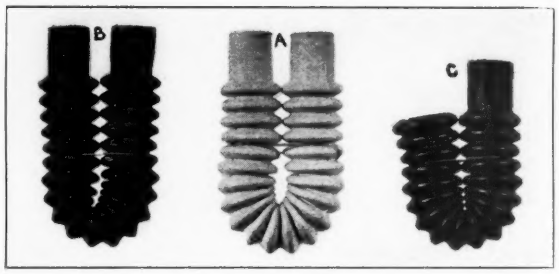


Fig. 4. Corrugated Connection Hose Must Become Neither Constricted Nor Collapsed to Safeguard Unimpaired Breathing—A Illustrates Davis Design Folded But without Distortion Compared with B and C Which Are Constricted and Distorted

Head Harness

During the earlier use of gas masks the head harness, which holds the face piece in gas-tight contact with the face, was made of so-called "garter elastic." This was a tape with rubber threads woven into it to allow a considerable stretch. Three separate tapes of garter elastic were sewed together at a pad at the back of the head while the ends passed through six buckles attached to the face piece. Adjustment of the proper length of the straps was made before the mask was put on. This adjustment remained fixed until changed. The adjustment had to be changed each time a different man wore the mask.

Mr. Davidson changed this construction by developing the head harness of rubber molded in one piece to replace the garter elastic. The useful life of this new type exceeded that of the old many times. In fact a molded rubber head harness gives the same long life as the molded rubber face piece because it retains its strength better than webbing.

A later development, by the Davis company, consisted of a quick detachable buckle, which permitted donning the face piece with the straps of the head harness loose, then pulling them up quickly into tight position. The convenience of adjusting the head harness was materially increased when several different men were to use the same mask. These quick adjustment buckles are now also standard practise for all manufacturers.

Exhale Valve

The exhale valve is another part of the mask in which the flexing characteristic of rubber plays such an important part. The exhale valve, of whatever design, consists of two pieces of rubber which separate to permit the passage of the exhaled air and which come together to form a gas-tight seal the instant exhalation has ceased. It must open easily to permit the exhaled air to leave the mask with minimum resistance, thus reducing the tiring effort otherwise imposed upon the wearer.

Lens Clarifying Tubes

Another vital part of the gas mask where flexibility, moldability, and moderate rigidity make rubber an ideal material to use is the clarifying tube which carries the incoming dry air over the lenses of the mask to evaporate any moisture of the damp exhaled air which has a tendency to condense there. This evaporation clarifies the vision—hence the name "clarifying" tubes.

Corrugated Connection Hose

The mask is worn on the face, and, of course, there must be complete freedom of head motion for the wearer to perform the usual tasks of industry. The weight of the canister with its chemicals to neutralize the toxic gas can best be supported on the body. The pull of the hose, of a hose type mask, can best be taken by the body to which it is connected by a fitting attached to a body belt. In either instance there must be a very flexible connection between the mask, with its requirement of complete freedom of motion, and the body which can be considered as the fixed point.

So, here again, rubber, with its flexibility, proves the ideal medium out of which to mold the connecting hose. This connecting hose is corrugated to prevent collapsing as it flexes and to give greater flexibility. Should the hose collapse, it would shut off the air from the face piece. Should the cross-section of the hose even lessen, as it bends, it would make breathing difficult.

A great difference exists in the non-collapsing qualities of the various corrugated hose available on the market, as will be seen in Figure 4. The severe test of a hose being bent back on itself shows up both errors in design of the outline of the corrugations and faults in the compounding or molding of the rubber.

Variations in the wall thickness of the connection hose will cause undesirable deformations; therefore an item that would appear just a simple molding operation becomes one of the most exacting care.

Canister Check Valve

At the bottom of the canister is a rubber check valve which must open so easily as not to produce a tiring effect on the man breathing air through the chemicals of the canister. This resistance must be negligible in relation to the resistance of the chemicals themselves. The valve must also close both quickly and completely to prevent any of the air being exhaled into the mask backing up into the intake systems to be rebreathed the next inhalation cycle.

Assembly

A face piece is stitched together at its bottom symmetrical outline. This joint is made gas tight by vulcanizing. The buckles are attached to the margin of the mask. The lenses are set in place, and the tubular opening at the bottom of the mask is slipped over an aluminum fitting and the clarifying tubes are attached—the exhale valve and guard already having been assembled into this fitting. The corrugated hose is then attached to this aluminum fitting to form a complete mask assembly.

Hose or Fresh-Air Type of Mask

In instances where the concentration of gas is too great to be neutralized by the chemicals of the canister type of mask or where the oxygen is insufficient to support life, a hose mask or self-contained breathing apparatus must be used. In the former, air is pumped into the mask from some area where the inlet of the blower will be in gas-free air. A wire wound rubber hose is used to connect the source of air supply with the wearer of the mask. Wire reenforcing prevents breaking or crushing of the hose by external forces.

This hose must be sufficiently light and flexible to pre-

(*Continued on page* 43)

Annals of Rubber[1]

Chronological Record of the Important Events in the History of Rubber

1905. The clincher type of carcass had become the standard for motor cars in Europe as well as in America.

The Rubber Goods Mfg. Co. merged with the United States Rubber Co.

1906. George Oenslager discovered that aniline and other organic substances act to accelerate the vulcanization of rubber.

1907. The flat base tire rim became standard on American automobiles about this date.

Rubber Growers' Association, Inc., London, England, was "formed to enable those concerned to discuss and take combined action on matters affecting their mutual interests."

Guayule attained commercial importance as a factor in the crude rubber market.

The Diamond Rubber Co., Akron, O., in the latter part of this year used aniline and thiocarbanilide in all the tires it manufactured.

1908. The First International Rubber and Allied Trades Exhibition was held at Olympia, London, England, the last two weeks of September.

1909. Rubber Section, American Chemical Society, was organized in December. Charles C. Goodrich, of New York, N. Y., and Akron, O., was president, Frederick J. Maywald, secretary.

New England Rubber Club changed its name to The Rubber Club of America, and the organization was incorporated under the laws of Massachusetts.

1910. About this date a new cable cord tire construction was invented by the Silvertown Co. of England in which, for purely tinctorial reasons, channel carbon black was used in the tread of this patented tire. Investigations by The B. F. Goodrich Co. revealed its unusual tread wear resistance.

1911. The Second International Rubber and Allied Trades Exhibition was held in London, England, June 24 to July 15.

Committee D-11 of the American Society for Testing Materials was appointed. Its function is the preparation of standard specifications for rubber products.

1912. About 75% of the world's consumption of rubber came from trees, shrubs, and vines growing wild.

James Tew and George Oenslager, of The B. F. Goodrich Co., Akron, O., introduced the use of relatively large amounts of carbon black in tire treads as an integral part of the development of the cord tire to secure increased mileage.

The Third International Rubber and Allied Trades Exhibition was held in Grand Central Palace, New York, N. Y., September 23 to October 13.

The Diamond Rubber Co., Akron, O., largely replaced aniline with *p*-aminodimethylaniline, after its superior qualities as an accelerator had been discovered by David Spence.

1913. G. & J. Tire Co., Indianapolis, Ind., established a physical and chemical laboratory for research, development, and plant operation control.

International Association for Rubber and Other Cultivations in the Netherlands Indies was established.

The United States Rubber Co. made application to the New York Stock Exchange to list $6,000,000 additional common stock to be used for the purchase of the Rubber Regenerating Co., Mishawaka, Ind.

The Hodgman Rubber Co., established in 1838, completed seventy-five years of continuous and active operation in the control of three generations of the Hodgman family.

Rubber Congress met at Para, Brazil, August 15, on the invitation of the Commission of Economic Defense of Amazonia.

1914. The Rubber Trade Association of New York, Inc., was formed. Its objects and purposes are described by its preamble as follows:

"The objects and purposes of the Association are to foster and promote the best interests of the crude rubber trade as a whole for the benefit of all concerned, importers, brokers, dealers and consumers, to reform any abuses relative thereto, to procure uniformity and certainty in the customs and usages of the rubber trade, to settle differences and disputes in the trade by arbitration, to promote a more enlarged and friendly intercourse between those engaged in the trade, and for those purposes to make and enact rules for the proper supervision and efficient conduct of the trade."

Introduction of the use of cable cord to replace square woven fabric for the body of a tire gave increased resilience to the construction.

The use of carbon black in rubber compounding practice became general to increase tire mileage.

The Fourth International Rubber Exhibition was held in London.

1915. Cord tire construction was extensively used.

H. A. Winkelmann, Akron, O., was the first to receive a United States patent for a rubber antioxidant.

Schidrowitz and Goldsborough were granted United States patent No. 1,156,184 for making spongy rubber from latex.

1916. I. Ostromyslenski discovered vulcanization of rubber by means of trinitrobenzene.

1917. Experiments in bud grafting began about this date to increase the productivity of rubber plantations.

The Rubber Age (N. Y.) was established as a journal of the rubber industry in America.

1918. S. J. Peachey was granted British patent No. 129,826 for vulcanization of rubber by exposing it successively to the action of two gases, sulphur dioxide and hydrogen sulphide.

Charles R. Boggs was granted United States patent No. 1,249,272 for a process of vulcanizing rubber by means of selenium or its compounds together with an artificial accelerator such as beta-naphthylamine.

1919. The Rubber Division, American Chemical Society, was organized April 7, superseding the former Rubber Section.

(*Continued on page* 43)

[1] Continued from India Rubber World, Nov. 1, 1935, p. 40.

Consumers' Crude Rubber Requirements[1]

George A. Sackett[2]

A LIST of every requirement of the principal raw material of an industry as vast and as diversified in its interests as the rubber industry would be difficult to make. It is desirable, however, to consider the more important requirements for the rubber industry so that the producers may have a clearer conception of the consumers' needs. It is hoped that the result of focusing attention on the items discussed will eventually lead to the production of a type of rubber which may more nearly meet the consumers' ideal than any form produced previously.

Latex and its requirements will not be considered, for they are too specialized and should form a subject for separate discussion at another time. Nor will the present discussion consider ways and means which might be used by the producer to meet the requirements listed, for such considerations are beyond the scope of this paper.

Those requirements which seem to be general to the whole industry are as follows:

1. Uniform rate of cure or modulus to produce stocks of uniform strength and stiffness.
2. Uniform age resistance to guard against the sale and use of rubber which might be poor in this respect.
3. Cleanliness to improve the quality of stocks and eliminate the necessity of washing or straining to remove foreign matter.
4. Better packaging to facilitate handling and storage and prevent admission of dirt.
5. Freedom from diluents to avoid the presence of materials affecting compounding.
6. Freedom from deleterious materials to avoid premature deterioration of rubber goods.
7. Uniform plasticity to facilitate processing by avoiding dangers of scorching.
8. Low plasticity to eliminate part, if not all, of the expensive mastication process.

Other requirements are of considerable importance to some branches of the rubber industry, but they are not generally applicable and will not be considered in detail here. Thus, low water absorption is of importance to the wire insulation industry, and it has been and is being actively investigated. The development of a light-colored sheet has been studied for a number of years, but it is not of general interest since it is confined to those requirements where color is important together with a lower plasticity. It is believed, however, that practically all branches of the industry are interested in the properties listed.

Uniform Rate of Cure

One of the properties generally requested of rubber producers is that crude rubber should have a uniform rate of cure. However, unless some definite means are supplied to determine the rate of cure, it is useless to ask the producer to incorporate this property in his rubber. Rate of cure may be defined as the time and temperature required for a rubber when compounded in a standard formula to reach a degree of vulcanization characterized by certain well-defined properties. It is beyond the scope of this paper to discuss the various properties used for this purpose or to analyze the relative merits of the various proposed methods for determining the rate of cure.

However it is pertinent to the present discussion to consider the adoption of a standard method of determining the state of cure desired and to propose formulae for the purpose of testing rubber to ascertain its degree of uniformity. What follows is for the purpose of suggestion, with the idea that after discussion and consideration certain standard methods of test will be evolved so that the producing interests can study methods of improving the uniformity of their material.

BEST PROPERTY FOR MEASURING CURE. Articles made of soft vulcanized rubber (as distinguished from ebonite or hard rubber and also from uncured rubber) are manufactured for the purpose of fitting the intrinsic properties of the rubber hydrocarbon to the needs of the article and for the service under consideration. The time and temperature of vulcanization are largely controlled by the economics of the factory, and the compounding is designed to give the product optimum quality, with due regard to quality after aging either in service or in storage.

With this in mind compounders usually balance their curing agents so that the stock will have a definite state of cure, dependent on the article and its service requirements. Unless these requirements demand a positive under- or overcure, the stock is usually compounded so that it has a technical "best cure" at the time and temperature required by the manufacturing process. One way of fixing the state of best cure is by a hand test which reflects both modulus and tear resistance.

Since we are primarily concerned with the practical use of rubber, we should use a similar method for determining the state of cure of a stock used for rubber testing. This stock should be a pure gum type, for loading masks the effect of the rubber variations, and it should recognize the universal use of organic accelerators. The accelerator used should be quite generally accepted as a standard, should be widely available in a constant degree of purity, and should typify, if possible, a class of accelerators. As a basic type accelerator, diphenylguanidine suggests itself. The following formula and cures are suggested:

Rubber	100.00	Sulphur	4.00
Zinc oxide	5.00	Diphenylguanidine	0.75

Cure: 20, 30, 40, 50, 60, 80 minutes at 274° F. (134° C.).

This stock will give a "best cure" in about 50 minutes.

An accelerator of the acidic type is also desirable for

[1] Paper presented before the Division of Rubber Chemistry at the Eighty-ninth Meeting of the A. C. S., New York, N. Y., April 22 to 26, 1935. Reprinted from *Ind. Eng. Chem.*, Oct., 1935, pp. 1201-204.

[2] Goodyear Tire & Rubber Co., Akron, O.

examining rubber. Mercaptobenzothiazole is suggested, and the following formula is believed acceptable:

Rubber	100.00	Sulphur	3.50
Zinc oxide	6.00	Mercaptobenzothiazole	0.50
Stearic acid	1.00		

Cure: 20, 30, 40, 50, 60, 80 minutes at 260° F. (127° C.).

This stock gives a best cure in about 50 minutes.

A large number of rubber samples have been examined by these formulae, and the conclusion has been reached that plantation smoked sheets do not seriously vary in rate of cure, if we agree with what has been said above that the rate of cure is considered to be the time required to vulcanize the compound to a technical best cure as judged by hand tear test in a specified formula at a given temperature.

Variation in Rubber. This statement is not intended to imply that rubber does not vary, however, for, as tested in the mercaptobenzothiazole formula, at the best cure there will be marked differences in the modulus of various samples.

Modulus is an important property and should be uniform, if possible, for it is used widely in practice. It serves as an index of quality of a given sample of stock. As outlined above, a stock is designed for certain purposes, and the details of manufacture are worked out. In order to control the stock in production it is necessary to apply some unit of measurement of its important properties. The modulus is generally used for this purpose.

For control purposes raw materials are subjected to test before they enter production. Experience shows whether all materials must be put through a compounding test using standard components of the batch, or whether simpler chemical or physical tests suffice. Rubber, however, can be tested only in a compounded and cured stock. It is logical, therefore, to apply the same unit of measurement of quality in this test that is used when testing the finished batch. Modulus is the unit usually adopted because other tests are more expensive and take too much time to serve for control purposes.

The mercaptobenzothiazole formula given is useful for this purpose. If rubber is compounded in this formula, rapid results can be obtained, and the rubber can be graded according to modulus. Furthermore experience has shown that on the basis of the test obtained, the rubber can be blended to give the modulus desired. Thus we can be assured that the physical properties of the finished batch will not vary because of the rubber.

In order to avoid a misunderstanding between what has been said about modulus and what was said about cure or rate of cure, it should be pointed out that, if a rubber gives a high modulus test in the time selected (which should be such as to give approximately a best cure), a decrease in time of cure will bring the modulus down. But it also alters the state of cure which seriously affects the performance and, therefore, the quality of the finished stock. It is better to bring the modulus down by blending such rubber with rubber which shows a low modulus. Low-modulus rubber should be treated in a similar manner.

In working out such a scheme of blending it is necessary first to run a number of samples of rubber and plot a distribution cure. The range of modulus found to be average can then be selected. Rubber from this average range is then used in developing any stock, and in production the rubbers can be balanced in proportion to modulus.

The modulus property is important in lightly loaded stocks. Loading masks modulus changes, and variations in the modulus of the rubber are not so clearly reflected in highly loaded stocks. Whether it will ever be possible for the plantations to produce a rubber of uniform modulus is open to question. The difficulties to be overcome are very great, but the elimination of blending and the improved properties of the final products make it desirable to produce a crude rubber with a minimum of variation in this respect.

Uniform Age Resistance

The manufacture of rubber from the latex from seedling trees did not allow the properties of the rubber from any single tree to affect a large amount of finished product. With the development of large areas of clonal plantings, it becomes advisable that an intensive study be made to assure the consumer that clonal rubber of various types possesses no undesirable properties. The clonal rubber from different geographical locations and the effect of different soils in the same general location should be studied.

The formulae given for testing the rate of cure are suitable for studying age resistance. The diphenylguanidine stock might be aged for twelve days in the Geer oven at 70°.

The mercaptobenzothiazole stock may be aged in the Geer oven for twelve days at 70°, or it may be aged in the air bomb or the oxygen bomb. Increase in modulus should be observed, or, if oxidation has proceeded farther, the decrease in tensile strength should be used as an indication of age resistance.

It may be desirable to see whether a natural deficiency of antioxidant could be corrected for by the addition of organic antioxidants. In such a case, 1% phenyl-β-naphthylamine should be added. The formula then becomes:

Rubber	100.00	Stearic acid	1.00
Zinc oxide	6.00	Mercaptobenzothiazole	0.50
Sulphur	3.50	Phenyl-β-naphthylamine	1.00

It will be necessary to collect a great deal of data to establish the relative age resistance of various clonal rubbers. Conclusions cannot be drawn fairly from a few tests. The rubber should be collected from a large number of trees in different places and manufactured in a strictly comparable and practical manner. The curing agents should be so adjusted that the samples cure to the same state in approximately the same time.

For use as a standard sample, some clone should be selected which gives properties comparable to those of the usual seedling rubber. Provision might be made to ship this clonal rubber directly from a given place to the research station carrying on the work.

Cleanliness

The relatively high consumption of amber crepes and similar grades of rubber is evidence that absolute cleanliness is not absolutely essential for compounding all rubber goods. There are a number of rubber articles, such as inner tubes, hot water bottles, and the like, which do require rubber of the highest possible degree of freedom from foreign matter. There is no advantage other than the economic one in using rubber with a small amount of dirt in it. In a tire tread a small amount of sand and bark has no doubt been tolerated; however, there is little question but that a clean rubber would be better. A small particle of sand in an inner tube will soon cut through and develop into a leak, so that freedom from dirt is a prime requisite for this type of stock.

The crude methods used by the native plantation owners preclude the possibility of ever getting more than a small amount of clean rubber from that source. The European plantation, therefore, is and probably always will be the chief supply. The quality of rubber from

these plantations, however, should improve continuously if these plantations want to hold their leadership in this field. Rubber manufacturers have always had to find ways to clean and use a more or less dirty material for special purposes. In the earlier days it was necessary to use large quantities of wild rubber, and the wide fluctuations in price which have occurred have made it necessary for economic reasons to adapt the poorer grades of rubber to products which would never have called for such raw material had a constant supply of clean rubber been available.

There is no method of measuring quantitatively the cleanliness of rubber. Dependence must be placed on a visual examination, and it is difficult to see all the finer particles of sand. The performance of some cured stocks in practical use will show the effects of sand and bark. Great care in handling latex, followed by clean smoking and good packing, will go a long way toward the realization of a superior rubber. The necessary precautions to produce a really clean rubber may cost a small amount of money, and this added expense might be hard to collect as a premium, but the establishment and maintenance of a position of superiority over the poorer grades and the ready market for this rubber should justify such slight expense. It is possible and, if the example of other industries is followed, it is probable, that the clean rubber may be produced at no higher cost than the present material. The requirements of the consumer for a really clean rubber are great and worthy of serious consideration by the producers.

Better Packaging

Clean rubber demands a suitable container; otherwise the money spent in removing the dirt on the plantation is wasted. The veneer chest, which is the standard container, has the disadvantage of splintering when broken and of giving off splinters to the sheet during storage. There has been evidence at times that veneer chests of inferior quality have been used. These chests break easily in handling and form a large amount of small splinters which adhere to the rubber.

Jute wrappings have been used for years, but rubber packed in them is not tenderable. They have been adopted for reasons of economy by consumers who purchase in eastern markets. The rubber is examined before packing, and no further examination is required. Rubber packed in this manner is not as easily stored, and the bales are apt to become badly distorted during transit to the destination.

If rubber were always handled directly to the consumer with only a short period of storage, the problem would be fairly simple. Rubber is a commodity which can be stored, and is stored, for relatively long periods of time. That rubber, then, which is sold on the open market must be packed in a case that will contain as much as the present case and will not splinter. It should be light in weight to keep down freight charges and should withstand rough handling. It should be cheap. There is a real demand for such a container.

There is no complaint about the market grades of plantation rubber with respect to the presence of excessive amounts of non-rubber material. There have appeared recently, however, some samples of new forms of rubber which contained large amounts of added substance designed to prevent adhesion of the rubber particles and consequently preserve the original form of the rubber.

Consumers of crude rubber are glad to welcome new forms of their principal raw material and to adapt it to their requirements if there is any advantage in experimenting with it. Large percentages of starch, dextrin, zinc stearate, talc, or other material is, however, a positive deterrent to the use of such new products. There may be a few places where the non-rubber materials in large proportion would not be objectionable, but the annual consumption of crude rubber for these purposes is extremely small.

Any form of rubber which retains more of the natural non-rubbers from the original latex is sure to meet with considerable opposition. These substances affect the rate of cure and certain properties of the finished article. If compensation can be effected, special handling is required which has been found to be not always economically feasible.

Rubber prices are always based on the current market price of an accepted standard type of crude material. This is, and probably will be for some time, smoked sheets. Naturally, therefore, any form which contains more non-rubber than smoked sheet will be considered on the basis of its rubber content. Those claims of higher yields and greater returns obtainable from methods of manufacturing crude rubber which are based only on the inclusion of amounts of non-rubbers greater than those occurring in standard types will usually be found false. The same applies to those claims for types which call for added non-rubber materials.

The consumer will probably always demand that crude rubber contain the minimum amount of non-rubber material compatible with high quality of both crude rubber and finished articles.

Freedom from Deleterious Materials

That rubber should be free from the presence of any material which would adversely affect the service obtainable from a rubber product is self-evident. Fortunately there has been little difficulty with plantation rubber from this cause.

New methods of treating coagulum are proposed from time to time by people who are interested only in the sale of a proprietary material and not in the future of the resultant product. In order to insure against the danger of producing an inferior rubber, the plantations should make sure that any deviation which they propose to make from the standard accepted methods has been approved by the technical organizations established for their benefit.

There has been some trouble due to a faulty water supply on a plantation. The water supply systems of all plantations should be checked, and, if found faulty, correctives should be applied immediately.

Crude rubber should always be prepared according to an accepted standard method from materials of known satisfactory composition.

Uniform Plasticity

Crude rubber from different plantations, and even from the same plantation, shows considerable variation in plasticity. The studies made so far have not resulted in any improvement of uniformity of this property. Processing variations result from variations in the plasticity; in order to avoid these variations constant control of the amount of plasticizing is necessary.

The use of accelerators which are sensitive at low temperatures has accentuated the difficulties caused by the rubber. Crude rubber consumers are restricted in their study of this problem by their geographical distance from the point of production. It is a matter for the producer, working with technical and research organizations, to investigate fully.

The role of oxygen in softening rubber is well recognized. Studies of drying temperatures and the content

of natural antioxidants in the latex might throw some light on this matter.

Low Plasticity

A remarkable change would be effected in the whole rubber manufacturing industry if producers were to find a method of making a rubber which was soft enough to use directly. Such a rubber would be worth a great deal, but the low plasticity must be obtained at small cost because cheap power and efficient machinery keep the consumers' costs of plasticizing down to a low figure.

Some types of manufacture which require soft rubber could afford to pay more for a low-plasticity material, and the development of a soft rubber, with properties equal to those of present crude rubber, would be welcome.

Soft rubber, however, would require a special type of package. Examination would be impossible, and long periods of storage would not be favorable. Such a material, therefore, would require more direct contact between producer and consumer.

Conclusions

In this brief summary of requirements much has been left unsaid. It is difficult to be specific, for the requirements of the rubber manufacturing industry vary widely. It is hoped, however, that this presentation will focus some attention on the subject, and that eventually a more definite idea of the requirements of the various consumers will be presented so that plans of research in rubber-producing parts of the world can be made to develop the products needed by the consumer. This would also aid in the development of closer contact by both producer and consumer, desirable in any industry.

The formulae suggested are open to criticism, and it is hoped that if those suggested are not adopted as standard, others more generally accepted will be evolved so that there may be a universal agreement on the method of testing certain properties of rubber.

It may be argued that a rubber which combined all the properties mentioned would be ideal, but it is well to set up an ideal to strive for so that through the collaboration of producer and consumer it may perhaps be realized.

Thiokol Molding Powder[1]

THIOKOL molding powder is fully vulcanized and compounded and merely requires forming in the press for approximately three minutes at about 300° F. In this manner synthetic oilproof rubber molded products may be produced at greatly reduced costs. At present two types of Thiokol molding powders are available: No. 1 with hardness of 72, Shore durometer, and No. 2 with hardness of 55. Both powders are black in color. These molding powders have 3¼ times the volume in the powder form that they have in solid form.

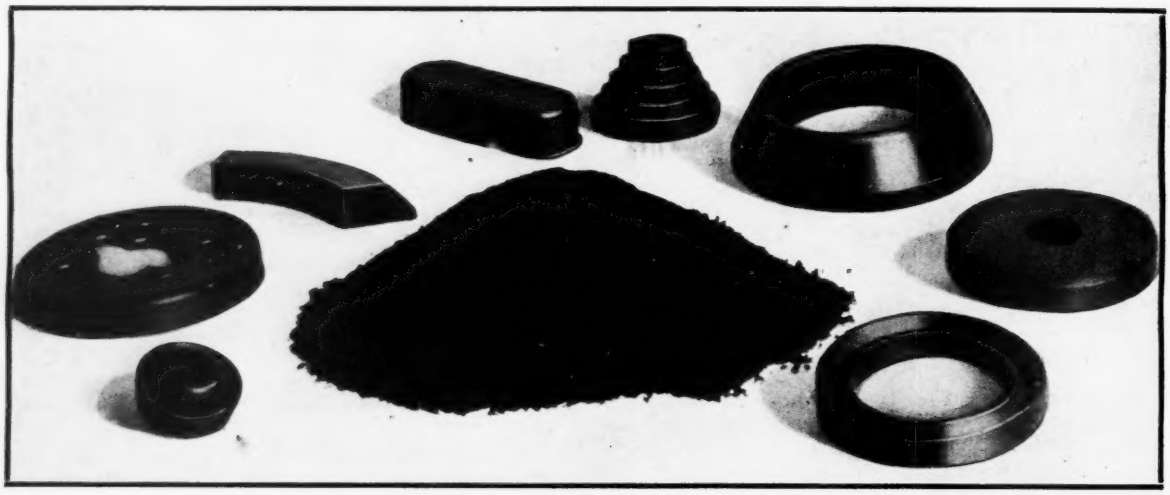
A plunger mold would be required with a cavity 3¼ times the volume of the finished molded article. In molding Thiokol the press should be brought down slowly or else brought down part way, allowing one or two minutes for the material to heat. The press is then closed completely for two or three minutes to allow the powder to flow and knit together. If sufficient time is not allowed, the powder will not flow together completely and will give a tough, porous product. Small objects such as those pictured can be molded in three minutes and large ½-inch sheets in five minutes.

Flat sheets can be made without a mold by using spacer irons in the press for thickness and heaping the powder in the center of the enclosure thus formed.

Products made from these molding powders have excellent aging qualities and unusual stability against sunshine, oxidation, and ozone, as well as a mild and not objectionable odor.

Thiokol in batched and powder forms is a noteworthy addition to the resources of the rubber compounder in further extending the industrial applications of natural rubber, especially where service conditions require that the product be completely resistant to the destructive influences met with in handling oils and the ordinary solvents of rubber.

[1] Data from Thiokol Corp., Yardville, N. J.



Typical Molded Articles from Thiokol Molding Powder

Electric Vulcanizer Progress

A Mechanical Development of Surpassing Dimensional Accuracy and Heat Control

H. H. Heinrich [1]

EVEN a brief review of the accomplishments of the rubber industry of the United States during the last thirty years causes one to encounter so many examples of progressive steps of such outstanding merit as to cause amazement.

Tire and Tube Advancement

A tire and a tube giving 5,000 miles of service only a few years ago were considered a phenomenally progressive development. Now the motorist pays but a fraction of the former price and is disgusted beyond consolation if he obtains under 20,000 miles—this, too, despite the greater power, faster acceleration, and the more highly efficient braking mechanism of cars today dissipating their incalculable forces into and through the tires.

Other Rubber Products

Garden hose, formerly involving a complicated variety of specification eluding manufacturing operations, has given way to a continuous method of producing tremendous lengths of uniform product by simply synchronizing tubers, braiders, lead presses, and vulcanizers. And so goes the story with shoes, clothing, thread, belts, and other rubber articles; the product simplified and improved, yet cheapened.

Science and Engineering

Almost without exception these developments have come about gradually and in an evolutionary fashion. While the progress per week could not be measured, that per year became impressive, and that of a decade has been enormous. Much of the change has been the result of scientific findings and much of it of engineering research. In fact it can be truly stated that the commercial value of the work of either would perhaps never have become important without the complementary accomplishment of the other.

Rubber Printing Plates

In this exact fashion a relatively new application of rubber promises to become an industry of substantial size and of universal importance. Reference is being made to the manufacture and use of rubber printing plates. Rubber printing plates have been known for more than thirty years, having at times taken limited commercial importance followed by almost complete disfavor due to various causes; mainly among which were improper curing equipment for the exacting dimensional requirements, and rubber stocks inadequately fitted to resist the disintegrating effects of ink vehicles.

By various means, for example, the use of synthetic rubbers such as "DuPrene"[2] and Thiokol, chemists have formulated rubber compounds that have quite effectively removed the latter difficulty. This accomplishment has been concurrently progressing with another, a mechanical one, with which the author has been intimately connected and that has proved to be the answer to the first-mentioned difficulty which has stood in the way of rubber printing plate acceptance.

Precision Platen Press

Vulcanizers heretofore used for printing plate experiments were those designed for rubber stamps or for other molded rubber goods where very accurate dimensions were either unimportant or the importance was not sufficiently recognized. In any event accuracy was not obtained, and the rubber plates so made were unsuccessful in that they would not produce a delicately screened halftone of uniform printing effect, or could multicolor work be done with perfect registration because of the resilient flow of thick regions and the deformation of thin ones.

A few years ago the engineers of H. H. Heinrich, Inc., undertook the study here and abroad of printing plate mechanical requirements and the development, then, of a vulcanizer to suit the very exacting need. The result has been a self-contained automatically operated electrical platen press that differs from others both in appearance and operation by about the same margin as exists between that proverbially popular small car of 1910 vintage and lithe, streamlined, and fascinating automotive creations dominating the recent New York show.

In this vulcanizer heavy slabs of high quality steel at either end serve the varied purposes of frame, lower platen guide, and housing for the automatic hydraulic pump and oil reservoir that supplies the two rams for activating the lower platen to exert any desired pressure from the so-called "kiss touch" to 72 tons, instantaneously if desired. The platens operate with an accuracy of 0.001 inch by virtue of adjustable V-guides and synchronized rams.

Electrically Heated

Plugging into the electric socket not only furnishes the means of activating this press, but also affords the source of heat. Hermetically sealed, thoroughly packed, and closely spaced heating units are fixed in a platen surface plate of carefully annealed carbon steel with dead air designing that causes localization rather than dissipation of heat, thus assuming absolute uniformity. The advantages of electricity without its spotty heating and fragile unit disadvantages have been designed herein.

Neat—Clean—Noiseless

The front and back housing closures, the integral work shelf, and the time, temperature, and hydraulic controls all combine to produce a sensitive, neat, clean, and noiseless mechanism that has a sturdiness appropriate to the factory, yet a quiet dignity suiting it to the most immaculate biological laboratory or sanitary manufacturing department.

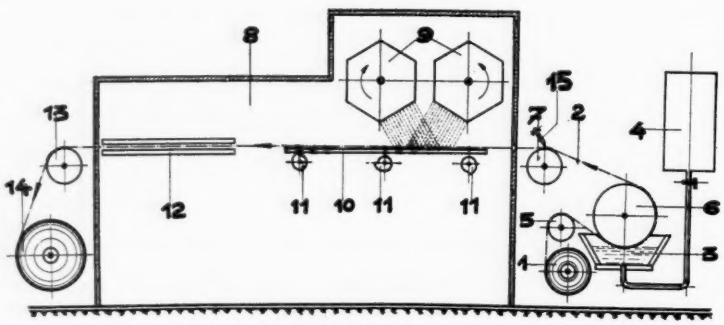
(Continued on page 40)

[1] President of H. H. Heinrich, Inc., 200 Varick St., New York, N. Y.
[2] Trade mark registered.

Artificial Velvet[1]

New Rayon-Latex Product with Extensive Decorative Possibilities

SIMULATION of real silk velvet effects of sheen, color, and feel are well realized by rayon flock applied to a fabric or paper base somewhat after the method of using cotton flock to imitate suede leather. The products are particularly attractive and useful for decorative purposes in several industrial lines. Among many applications, these materials are employed as ornamental finish for rubber cushions, hot water bottles, bathing caps and shoes, covers for gaming tables, draperies and upholstery, and coating for articles made of wood, pasteboard, pulp, glass, metal, etc. Colored velveted papers are used as wall paper, for making carnival articles, and in place of plush to give a luxurious effect as lining of special boxes and cases for small articles.



Velvetizing Apparatus

1. Rolled Fabric—2. Direction of Fabric Run—3. Adhesive—4. Adhesive Supply Container—5, 6, 7. Leading Rollers—8. Drying Chamber—9. Flock Sieve Drums—10. Tapping Arrangement—11. Cams—12. Heating Plates—13. Leading Roller—14. Finished Goods—15. Spreading Knife for the Adhesive

Fabric Base

The choice of the ground fabric for artificial silk depends upon the number of rubber spread coatings to be applied. If one coating only is to be used, the fabric construction should have a count of about eighty-eight squares in order to prevent penetration of the liquid of the coating through the material. Also the fabric should be dyed, sized, and have only a slight finish on one side as it is necessary to avoid shrinkage. However any fabric may be employed if it is rubberized before receiving the adhesive for the flock. It is essential that the surface receiving the flock be as smooth as possible.

Adhesive Coatings

The choice of adhesive for retaining the flock coating depends on the materials coated and the purpose for which the finished goods are intended. On cardboard non-watery adhesives can be advantageously employed that do not yield a very flexible film, such, for example, as those of zaponlac base. For pliable papers and fabrics adhesives should be used which do not influence unfavorably the velvet feel of the goods; therefore choice is made between rubber latex cement and rubber solvent cement. If it is desired to waterproof the goods, self-vulcanizing cements should be used.

Fabric Preparation

Preparation of the fabric base by filling its meshes with rubber is necessary if waterproof products are desired or if thin light textures are used. By utilizing rubber the flexibility and feel is obtained that is especially desirable in artificial velvet. The rubber ground work is applied by means of any spreading apparatus. In preparing light-weight fabrics care must be exercised that the composition does not strike through. This condition can be prevented by stretching the material as it passes the spreading knife of the machine without counter pressure by a roller under the knife. The latter should be rather sharp and set in opposite direction to that of the passing fabric. The textile sheet must have a perfectly smooth surface, which may necessitate calendering in addition to the spreading operation.

Application of Flock

An apparatus indicated in the illustration is used for coating prepared fabric with flock. In operation the prepared dry fabric travels from roll 1 through the apparatus in the direction indicated by the arrow point at 2 and is guided through the machine by the leading rollers 5, 6, 7, and 13 to the wind-up roller 14. In its progress the fabric passes around roller 6, where its lower surface contacts with liquid adhesive compound 3, the level of which is kept at suitable height by regulation of the supply from tank 4. The excess of adhesive coating is removed by the spreading knife 15, and the wet coated fabric passes into the chamber 8. As it enters, it is heavily dusted with flock discharged upon it from the two hexagonal box sieves 9. These revolve in opposite directions to apply a plentiful quantity of flock which should be five or six times the amount that is to remain on the finished goods. Sieves of hexagonal form of one millimeter mesh are found to be best. They are revolved as indicated by the arrows so that both sieves spray the same area on the fabric as the latter begins its passage along a tapping table 10, which is actuated by a series of cams 11. Tapping causes the flock fibers to distribute evenly over the surface and assume a more or less vertical position in the adhesive coating instead of lying flat upon it. The flock coated fabric passes next between a pair of hot plates for drying and vulcanization, which is effected in about five minutes.

Finishing

Artificial velvet is finally brushed, when dry, by a soft

(*Continued on page* 40)

[1] Data supplied by Böhimische Glanzstoff-Fabrik, Lovosice, Czechoslovakia.

Tire Repair Cores

Joseph Rossman, Ph.D.

THE following abstracts of United States patents conclude the informative article on cores used in retreading or repairing tires that began in our November issue.

35. Bruce and Aze, 1,408,980, Mar. 7, 1922. A vulcanizing core consists of an expansible resilient sleeve and expanding means for the sleeve comprising a plurality of radial movable segmental members of arcuate shape longitudinally and a member slidable longitudinally between the members and comprising wedge means for moving the segmental member radially.

36. Burdette, 1,412,799, Apr. 11, 1922. An airbag consists of a resilient body portion, including non-stretchable reenforcing strips arranged respectively to traverse opposite side portions and one end of the body portion; the side-traversing portions of each strip are substantially parallel with the major axis of the body portion.

37. Holden, 1,413,533, Apr. 18, 1922. An elastic tire expander is provided with a longitudinal elastic metallic core adapted, when the expander is longitudinally compressed, to expand uniformly radially and to expand the expander to increase uniformly its diameter.

38. Merz, 1,414,090, Apr. 25, 1922. An inflatable bag has inflation means and means to drain the bag comprising a clamping head, provided with an annular groove forming a collecting space for liquids, and a duct connecting the space with the exterior of the bag.

39. Merz, 1,414,091, Apr. 25, 1922. A device for repairing pneumatic tires has a central support surrounded by an inflatable airbag with means for attaching it to the support, comprising a frusto conical rigid head carrying a shank, an element movable along this and adapted to cooperate with the head to clamp the end of the airbag therebetween, and a clamping member on the shank and engaging the element.

40. Andrews, 1,428,201, Sept. 5, 1922. An air and steam bag for vulcanizers comprises a flexible casing with an expansion joint to allow radial expansion, rigid end members closing the ends of the casing, means for clamping the casing to the end members, and a steam container adapted for within the casing and provided with inlet and outlet pipes, the outlet pipe being flexible and adapted to extend within the steam container and lie at the lowest point thereof.

41. Smith, 1,440,751, Jan. 2, 1923. An airbag includes a casing with an open end and an annular depression adjacent it, an airtight inner tube insertible into the casing, a cap for housing the open end of the casing, an interior annular rib within and integral with the cap, the inner tube, when inflated, constituting means for distending the casing to grip the cap, the depression forming a seat for the rib, and a nipple extending from the tube and through the cap for engagement by an air tube.

42. Davies, 1,484,299, Feb. 19, 1924. A repair core to mold the inner surface of a tire casing comprises an arcuate body portion having a radial flange extending throughout its length and a removable curvilinear plate countersunk in one side face thereof; the plate is coextensive with the length of the body portion.

43. Maguire and Weese, 1,484,994, Feb. 26, 1924. A core for retreading tires comprises a solid body arcuate in form and of a flexible resilient material, the body having concentric inner and outer walls, the latter being arcuate in cross-sectional contour and the former having a flat portion extending along the longitudinal median line thereof and oppositely inclined portions merging the flat portion into the outer wall, and a facing of fabric secured to the body and handles at its ends.

44. Burdette, 1,549,962, Aug. 18, 1925. An airbag for receiving fluid under pressure embodies a non-metallic core and resilient walls adapted to be expanded only in one direction.

45. Carter, 1,553,982, Sept. 15, 1925. A vulcanizing device comprises an outer jacket with a longitudinal opening in one side, an airbag adapted to be mounted in the jacket, and means attached to the bag to enable it to be filled with air.

46. Burdette, 1,560,463, Nov. 3, 1925. An expansible airbag features walls reenforced with a strip of material having a series of fingers extending laterally therefrom, the strip of material extending longitudinally of the bag to restrict locally its expansion.

47. Sohl, 1,568,778, Jan. 5, 1926. A pneumatic core for vulcanizing consists of an inflatable bag member and unitary means inserted at one end of the member comprising a fluid inlet tube and a relatively smaller tube within the inlet tube, but not in communication therewith, extending into the central portion of the bag to permit escape of the fluid.

48. Huetter, 1,605,235, Nov. 2, 1926. In an expansible tire core are relatively adjustable tread and side core sections, a plurality of longitudinally movable tapered plungers enclosed within the assembly of core sections and exerting wedging influence upon each of the tread and side members to expand the assembly, and screw pressure means for simultaneously adjusting the plungers.

49. Huetter, 1,616,959, Feb. 8, 1927. An arcuate tire core comprises relatively movable longitudinally disposed hollow tread and side sections and a mechanically operated pressure member radially movable in the plane of the arc and having operative engagement with the side and tread sections to exert simultaneous pressure substantially radially upon the tread section and laterally upon the side sections and means to admit a fluid body to tread and side sections.

50. Wheelock, 1,625,383, Apr. 19, 1927. A sectional airbag comprises an inflatable, flexible body portion, an anchoring device at each end of the bag, and a tie member secured at each end to the anchoring device and extending longitudinally through the center of the bag; the tie member is flexible throughout so as not to interfere with the free flexibility of any portion of the bag.

51. Burdette, 1,628,304, May 10, 1927. A vulcaniz-

ing core adapted to be positioned within a pneumatic tire casing comprises a rigid supporting member and on it an expansible closed segmental arcuate container with concentric flexible walls adjacent its ends overlapping the support in concentric relation and free to move longitudinally of the support when the container is inflated.

52. Nestler, 1,635,094, July 5, 1927. A vulcanizing core consists of a fabric casing, with sections connected at the inner portion of the bag by a flexible line of stitching; the casing is curved longitudinally in the arc of a circle and adapted to be filled with sand.

53. Burdette, 1,676,817, July 10, 1928. A vulcanizing core comprises a flexible elongate arcuate container and a metal end member so connected thereto that an annular fold of the container at least partially surrounds the end member.

54. Benn, 1,685,900, Oct. 2, 1928. A sectional airbag comprises an expansible bag and a layer of cord fabric wrapped transversely of the bag many times; the cord fabric is embedded within the bag and vulcanized thereto except at a point on its inner surface where the cords are bunched together and separated from the body of the bag to form an eye by which the bag may be removed from the tire.

55. Dodge, 1,700,979, Feb. 5, 1929. A core consists of an elongated tubular fabric bag in which the warp thread runs longitudinally of the bag and increases in diameter from the inner to the outer surface; the thread is comparatively fine at the inner surface and comparatively coarse at the outer one.

56. Burke, 1,705,083, Mar. 12, 1929. An arcuate core-bag has a plurality of longitudinal expansion folds tapering off at each end.

57. Wersen, 1,721,580, July 23, 1929. A sectional repair bag comprises a tubular body having reenforced end walls and all-rubber sidewalls; the walls of the bag are thickened at the parts subjected to the greatest strain to prevent rupture due to the pressure within the bag during vulcanizing.

58. Desautels, 1,737,110, Nov. 26, 1929. A sectional repair bag has an arc-shaped body portion with a hole from end to end, a fluid-tight annular chamber surmounting the hole and completely contained in the body portion, a non-extensible member passing through the hole, abutments secured to each end of the member serving to prevent longitudinal expansion of the bag, and means for introducing fluid pressure into the chamber.

59. Desautels, 1,760,897, June 3, 1930. A sectional repair bag for use with external metal end plates joined by a straight connecting rod comprises a tube shaped to the curvature of the tire both longitudinally and transversely, a smaller rod receiving tube passing in an approximately straight line through the curved tube, and end walls extending approximately radial to the longitudinal curvature of the bag and joining the two tubes, whereby an annular fluid receiving chamber is provided around a hole extending in a straight line completely through the bag.

60. Garabiol, 1,788,428, Jan. 13, 1931. A torus-shaped device for maintaining airbags or water-bags during the vulcanizing of pneumatic tires comprises a number of arcuated elements having a groove on their external face and fitting into each other by mere juxtaposition end to end to form a nearly complete ring leaving between its ends a free space limited by inversely inclined faces, a wedge shaped piece also provided with an external groove adapted to fill the free space to complete the ring and to assure its rigidity, and means adapted to hold the wedge shaped piece in the free space.

61. Fredd, 1,793,472, Feb. 24, 1931. The vulcanizer has a pressure core and separate securing means for closing each end of the core; one of the means has pressure supply means communicating with the core, and the other has temperature controlling means.

62. Rystedt, 1,799,124, Mar. 31, 1931. An expansible tire core has a pair of longitudinally divided side sections, a reciprocatory operator interposed therebetween, a tread strip overlapping the line of separation between the sections, a slotted lug upon the tread strip, a flange upon the reciprocatory operator engaging in the slot of the lug to maintain the tread strip medially relative to the side sections in all positions of adjustment of the latter.

63. Snyder, 1,799,933, Apr. 7, 1931. A fluid pressure core is semi-circular in cross-section. The central portions of the dome and the base are of unreenforced rubber, that of the base being relatively more extensible than that of the dome; strips of square-cut square-woven fabric are embedded in the base adjacent the corners, and strips of bias-cut cord fabric extend around the square-cut square-woven strips and into the adjacent portions of dome and base.

64. Smith, McNeill, and Dolding, 1,818,766, Aug. 11, 1931. A sectional repair bag comprises a body portion having end walls and expansible sidewalls, rigid supporting plates embedded in the former, and a tie rod connecting the plates and maintaining them parallel.

65. Schmidt, 1,842,124, Jan. 19, 1932. A repair vulcanizer of the internal-arm type comprises a core arm including an inner heated member adapted to be mounted permanently and formed with flat parallel lateral faces, and an outer core member shaped to the contour of a tire and adapted removably to fit over the inner core member whereby the outer core member is replaceable by other outer core members of various sizes.

66. Biggs, 1,842,652, Jan. 26, 1932. An expansible core comprises an elongate vulcanized rubber structure reenforced with knitted fabric under tension in only one direction.

67. Semler, 1,910,128, May 23, 1933. An airbag for curing tires comprises a tube with walls forming a pressure chamber space, and a freely flexible heating element disposed in the chamber within the tube in spaced relation to its walls.

68. Heintz, 1,911,894, May 30, 1933. With transverse and longitudinal curvature of an airbag, a jacket has one end closed to fit the end of the bag, fastening means along the inner edges of the jacket, and a wire coil in its wall.

69. Semler, 1,963,871, June 19, 1934. A tire curing bag comprises an expansible tube having walls surrounding an axial internal chamber with heat transfer means, and further heat transfer means formed between inner and outer surfaces of the walls of the tube.

70. Glazner, 1,975,038, Sept. 25, 1934. The combination of a core consists of units connected end to end, each comprising laterally adjustable sections, and means to cause the simultaneous lateral adjustment of these sections.

71. Semler, 1,981,201, Nov. 20, 1934. A tire curing bag comprises an expansible sleeve having a heating element defining a closed chamber partitioned into compartments and means to provide a heat differential among them.

Dealers' and Distributers' Tire Stocks

In the United States, October 1, 1935[1]

THIS report covers stocks of tires held by both so-called *Independent Dealers* and *Mass Distributers;* returns from these two groups are discussed separately below. The survey is made with the support and cooperation of The Rubber Manufacturers Association, Inc.

Independent Dealers' Stocks

The survey of tire stocks in hands of dealers shows the following comparable statistics, as of October 1, for stocks held in 1935 as against 1934. The average number of automobile casings per dealer was 68.4 on October 1, 1935, compared with 63.8 a year ago. The lower number of returns this year than a year ago results from the fact that in the current survey the dealers circularized were only those reporting in the survey of October 1, 1934, plus a few thousand dealers subsequently added to the mailing list. The solid tire figures are shown as reported, but have become meaningless in terms of averages; also it is believed that several reports may have contained erroneous figures under this item.

INDEPENDENT DEALERS' STOCKS OF AUTOMOBILE TIRES

	October 1, 1934			October 1, 1935		
	No.	No. of Dealers Reporting	Average per Dealer	No.	No. of Dealers Reporting	Average per Dealer
Total casings	1,238,134	19,418	63.8	831,935	12,160	68.4
High pressure	123,682	11,887	10.4	77,816	6,993	11.1
Inner tubes	1,528,302	19,507	78.3	1,013,087	12,305	82.3
Solids	16,640	467	35.6	24,346	264	92.2

An analysis by volume groups has been prepared of the reports from dealers having stocks of casings, and a comparison made with the survey of October 1, 1934.

DEALERS CLASSIFIED BY VOLUME OF STOCK

	October 1, 1934			October 1, 1935		
	No. of Dealers	% of Total Dealers	No. of Casings	No. of Dealers	% of Total Dealers	No. of Casings
Less than 10	4,083	21.03	20,545	2,600	21.38	13,337
10 — 24	5,461	28.12	87,964	3,336	27.45	53,510
25 — 49	4,243	21.85	148,547	2,818	23.17	97,288
50 — 99	2,978	15.34	205,509	1,790	14.72	123,154
100 — 199	1,504	7.74	205,322	876	7.20	119,837
200 — 299	499	2.57	118,838	292	2.40	69,643
300 — 399	235	1.21	79,965	142	1.17	47,738
400 — 999	321	1.66	188,264	212	1.74	124,168
1,000 and over	94	0.48	183,180	94	0.77	183,260
Total	19,418	100.00	1,238,134	12,160	100.00	831,935

The following table compares average stocks per dealer reporting each item on October 1 in the surveys of 1926 to 1935, inclusive.

AVERAGE STOCKS PER DEALER ON OCTOBER 1

	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935
Total casings	49.9	57.6	64.8	68.4	62.4	60.2	71.3	61.3	63.8	68.4
Balloon casings	19.8	30.7	44.0	*	*	*	*	*	*	*
High pressure	*	*	*	22.9	14.5	11.3	12.0	9.8	10.4	11.1
Inner tubes	93.8	103.1	107.4	103.4	89.2	80.8	92.3	77.2	78.3	82.3
Solids, etc.	23.9	26.1	23.4	24.2	22.7	19.1	20.2	27.4	35.6	92.2

*Information not tabulated in survey indicated.

[1] Special Circular No. 3,590, Rubber Section, Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.

A special tabulation was made of the number of inner tubes, solid and cushion tires, and high pressure tires on hand, by volume groups, in the October 1 surveys of 1934 and 1935, as follows:

SPECIAL TABULATION—OCTOBER 1, 1934

Casings Volume Groups	No. of Reports	% of Total Casings	Inner Tubes No.	Inner Tubes % of Total	No. of Solids	No. of High Pressure
None	817	0.00	13,073	0.86	4,014	....
Less than 10	4,083	1.66	49,936	3.27	1,829	2,636
10 — 24	5,461	7.10	144,466	9.45	1,223	9,233
25 — 49	4,243	12.00	213,227	13.95	767	15,526
50 — 99	2,978	16.60	259,561	16.97	953	21,247
100 — 199	1,504	16.58	240,034	15.71	3,421	20,912
200 — 299	499	9.60	130,483	8.54	311	11,871
300 — 399	235	6.46	78,787	5.16	183	7,328
400 — 999	321	15.21	211,786	13.86	765	18,956
1,000 and over	94	14.79	186,949	12.23	3,174	15,973
Total	20,235	100.00	1,528,302	100.00	16,640	123,682

SPECIAL TABULATION—OCTOBER 1, 1935

Casings Volume Groups	No. of Reports	% of Total Casings	Inner Tubes No.	Inner Tubes % of Total	No. of Solids	No. of High Pressure
None	514	0.00	24,998	2.47	459	....
Less than 10	2,600	1.60	36,758	3.63	7,241	1,316
10 — 24	3,336	6.44	94,886	9.37	7,927	4,886
25 — 49	2,818	11.69	141,012	13.92	739	9,414
50 — 99	1,790	14.80	160,458	15.84	562	12,238
100 — 199	876	14.40	136,737	13.50	367	12,326
200 — 299	292	8.37	73,530	7.26	365	7,458
300 — 399	142	5.74	50,055	4.94	27	4,607
400 — 999	212	14.93	133,431	13.17	117	11,661
1,000 and over	94	22.03	161,222	15.90	6,542	13,910
Total	12,674	100.00	1,013,087	100.00	24,346	77,816

The tendency of dealers to concentrate on a single make of tire is shown in the following percentage table, covering October 1 surveys from 1925 to 1935, inclusive.

NUMBER OF MAKES HANDLED BY DEALERS

(Percentages of Total)
[October 1 Tire Surveys]

No. of Makes:	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935
1	41.6	44.8	48.6	54.9	64.2	70.3	70.5	70.2	69.7	70.2	69.2
2	36.5	36.9	35.5	33.7	27.4	23.5	23.7	24.3	24.6	24.2	24.7
3	15.1	12.7	11.2	8.5	5.9	4.3	4.1	3.9	3.7	4.1	4.5
Over 4	6.8	5.6	4.7	2.9	2.5	1.9	1.7	1.6	2.0	1.5	1.6
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

In the survey of October 1, 1935, dealers were again asked the following questions: Do you have equipment for vulcanizing passenger car tires? Do you have equipment for vulcanizing truck tires?

The following table summarizes the affirmative replies received from these two questions in the October 1 surveys from 1931 to date:

% OF TOTAL DEALERS VULCANIZING TIRES

	October 1				
	1931	1932	1933	1934	1935
Passenger car tires	14.0	14.1	11.8	11.6	11.8
Truck tires	6.6	6.7	5.2	5.5	5.6

The following specific questions were asked of all dealers reporting: Do you sell automobiles? Do you sell gasoline? Do you sell batteries? An analysis of the affirmative replies to these questions in the October 1 surveys, 1927-1935, appears on the next page.

% OF TOTAL DEALERS SELLING AUTOMOBILES, GASOLINE, AND BATTERIES

	October 1								
Dealers Selling:	1927	1928	1929	1930	1931	1932	1933	1934	1935
Automobiles	38.9	40.0	39.2	34.9	38.7	34.6	30.3	29.6	30.8
Gasoline	77.5	77.2	74.1	74.5	80.4	73.9	73.6	69.3	73.8
Batteries	56.4	60.9	59.7	65.3	72.1	68.0	67.2	64.7	68.3

A volume group breakdown, according to stocks on hand October 1, 1935, was made of the affirmative answers to the supplementary questions dealing with business done other than tire merchandising. Facts disclosed include the following: The dealers with small stocks and with very large stocks do not generally sell automobiles. As the size of the dealers increases, the percentage of those having vulcanizing equipment and selling batteries also increases; while the percentage selling gasoline declines. The percentages of total dealers, by volume groups, according to type of business, are as follows:

SPECIAL ANALYSIS OF BUSINESS OF TIRE DEALERS BY PERCENTAGES OF TOTAL DEALERS

	Vulcanizing Equipment		Dealers Selling			
No. of Casings	Passenger Car Tires	Truck Tires	Automobiles	Gasoline	Batteries	Total Dealers Reporting
None	4.7	1.6	8.9	70.6	46.7	4.0
Less than 10	4.5	1.3	17.5	74.2	53.9	20.5
10 — 24	6.3	1.9	25.8	77.6	67.7	26.3
25 — 49	9.5	3.9	41.1	76.1	76.3	22.2
50 — 99	15.7	6.3	47.9	73.4	77.4	14.1
100 — 199	26.6	14.6	40.2	68.1	76.8	6.9
200 — 299	41.4	25.7	32.2	60.7	72.5	2.3
300 — 399	48.6	31.2	22.9	50.7	72.9	1.1
400 — 999	52.0	40.4	19.1	59.6	79.1	1.8
1,000 and over	56.0	40.0	11.0	43.0	64.0	0.8
Total	11.8	5.6	30.8	73.8	68.3	100.0

Reports were received, too late for inclusion in any preceding tabulations, from 349 dealers of whom 337 reported 33,606 casings, 344 reported 34,398 inner tubes, and 10 reported 284 solid tires on hand October 1, 1935.

Small Mass Distributers' Stocks

The following tabulation covers reports received from small mass distributers including several oil companies, with less than 100 retail outlets each, arranged according to the number of outlets reported.

Outlets Reported	No. of Firms	Total No. of Outlets	No. of Casings	No. of Inner Tubes
2 — 9	39	170	7,894	9,700
10 — 24	26	393	14,651	15,257
25 — 49	9	299	7,003	11,172
50 — 99	8	492	8,787	12,104
	82	1,354	38,335	48,233
	2	Not Reported	4,246	6,263
Total	84		42,581	54,496

Large Mass Distributers' Stocks

Besides the reports mentioned in the preceding paragraph, 19 larger distributers classified in the oil company group and having more than 100 retail outlets each, handling either private brand or tire company brand tires, reported data shown below, in comparison with similar data for April, 1935.

1935	Reports Received	Stations Served	Casings on Hand	Inner Tubes on Hand
October	19	45,139	1,140,609	1,143,951
April	18	49,104	1,274,686	1,170,333

The usual survey of stocks held in 1,724 retail outlets operated by 6 tire manufacturing companies, and in the wholesale and 1,375 retail outlets operated by 2 mail order and 2 other chain store distributers, shows the following results in comparison with similar data for April 1.

1935	Reports Received	Retail Stores	Casings on Hand	Inner Tubes on Hand	Solids on Hand
October	10	3,099	1,681,036	1,616,725	4,903
April	10	2,760	1,557,441	1,344,305	3,730

Summary

Reports actually received are summarized in the following table:

	Reports Received	Retail Outlets	Casings on Hand	Inner Tubes on Hand
Dealers	12,674	12,674*	831,935	1,013,087
Dealers, late returns	349	349*	33,606	34,398
Small mass distributers	84	1,356†	42,581	54,496
Large mass distributers				
Oil company	19	45,139	1,140,609	1,143,951
Other	10	3,099	1,681,036	1,616,725
Totals	13,136	62,617	3,729,767	3,862,657

*Not including sub-dealers.
†Sub-outlets for only 82 firms.

It is probable that the reports from dealers are less than 25% of the total, for small mass distributers less than 20% of the total, for oil company mass distributers around 80% of the total, and other large distributers about 90% of the total. The following statement shows the result of applying these percentages to the reported figures, but is to be regarded as indicative of the approximate distributers stocks rather than necessarily accurate. Figures are in thousands.

		Tires	Tubes
Dealers	25%	3,462	4,190
Smaller distributers	20%	213	272
Oil distributers	80%	1,426	1,430
Chain stores	90%	1,868	1,796
Total		6,969	7,688

Electric Vulcanizer Progress

(*Continued from page* 35)

Other Rubber Goods

The value of this vulcanizer has been recognized for the manufacture of precise rubber products other than printing plates. It is peculiarly suited to delicate biological plungers and stoppers, X-ray envelopes, and numerous other precision molded products where cleanliness and low dimensional tolerances and curing delicacy have been heretofore difficult or impossible to attain.

It is conceivable that this development may usher in an era whereby the vulcanizer will be transported from place to place in the factory, going to the work rather than continuously transporting increments of production to the conventional press room.

Artificial Velvet

(*Continued from page* 36)

cylindrical brush. This brushing must not be done on the hot goods; otherwise the flock fibers will set in the direction of brushing instead of remaining vertical to the surface of the fabric base.

Velveted paper is done similarly in the same apparatus. It should be mentioned, however, that all sorts of paper are not suitable for this purpose. Thus, heavily sized or glazed papers are not adapted for the process because the adhesive coating will not hold well to them. The best papers to use are those that have a distinctly absorbent ability.

Rayon flock in standard lengths of 0.1 to 1 millimeter and upwards are manufactured especially for these products.

The Rubber Control Scheme at Work[1]

Everett G. Holt

OF GREAT moment, however, and also of much general interest, is the division of basic production quotas among producers in each territory; this is a function of the administrative restriction authorities in the government of each individual state party to the agreement. In Malaya and Netherlands India the assessment of quotas is a huge task, facilitated in the case of large estates, it is true, by information already on file in the government archives. Of course the desire of each government to allot its full quota and the fact that, with the quota applying to the country as a whole, an overallowance to any one producer must result in an underallowance to some other producer have complicated the problem and led to delays and dissatisfaction.

Charles K. Edmunds

Fire Rages through the Jungle, Set by the Hands of Men so That on the Land Cleared New Plantations May in Time Produce Even More Rubber to Be Put to Seemingly Endless Uses

Some Malayan estates object to their allotments on the ground that their conservatism in tapping during the depression has been unjustly interpreted as competitive weakness. They hold that those companies which have pursued a moderate tapping policy, husbanded their bark resources, and kept unwanted rubber off the market have been penalized by receiving lower per acre allotments than are granted to estates which produced at capacity, even at the expense of long-term productivity of their trees. But it should not be forgotten that, whereas country production quotas resulted from a bargain based on the depression status of production, and not from impartial consideration of equities, allotments to producers in each country have been determined not on the basis of capacity at prices now being or to be realized, but on the basis of the individual government's policy toward the various producing groups.

Ordinarily it seems to be an accepted aspect of most attempts at coöperative control of commodity output that the more efficient producers must make sacrifices for the general good. Available data indicate that, during the first seven months of rubber restriction, Malayan estates' quotas were far more liberal than for Malayan small holders and also notably higher than for estates in Netherlands India. To some it may appear that the native producers and small holders are, therefore, the efficient producers.

The problems of Malayan administration, being more or less familiar, probably arouse less speculation than do those of Netherlands India, which involve the vastly troublesome factor of native production there. In the course of the negotiations between representatives of British and Dutch producers, basic quotas for native producers in Netherlands India were agreed upon, but they were not published in the agreement. The understanding was that the Dutch native quota should bear the same relation to the Dutch estate quota—believed, by the way, to approximate normal capacity—that the native exports bore to exports of estate rubber in 1929. In that year the Netherlands Indian natives exported 71.5% as much as the estates—the highest ratio attained by the natives in any of the years from 1929 to 1932 inclusive, but far less than their current production capacity. The allotted tonnages are, for the years 1934, 1935, 1936, 1937, and 1938, as follows: estates—205,000, 233,000, 258,000, 272,000, 283,000; natives—147,000, 167,000, 185,000, 195,000, 202,000.

Nobody can say how much the Netherlands Indian natives could produce. The acreage and number of trees planted by them are known to be immense, and large numbers of trees are just coming to tapping age. In early 1934 the natives were exporting at the rate of almost 250,000 tons a year. Without restriction they could probably produce more than 300,000 tons a year at market levels current last fall, without importing additional labor. The Volksraad, or People's Council, of Netherlands India, which has powers little more than nominal, refused to ratify the agreement and pass the restriction laws, holding out for a 50-50 division of the basic quota between estates and natives, but the Netherlands Indian government made restriction effective by decree.

If the Netherlands Indian government desires at any time to reduce the production of estate rubber, it does so

[1] Reprinted from *Asia*, July, 1935, pp. 422-27. Concluded from INDIA RUBBER WORLD, Nov. 1, 1935, pp. 45-47.

by individual restriction under license. In Java it has also applied this method to small native holders. But with respect to the large native holdings in Sumatra and Borneo, it has levied high export taxes, which have the double effect of diminishing both price and output for the native producer, who taps his trees only when he can make a profit. Last year when first quality rubber was selling around 15¢ in New York, it was quoted around 23 guilder cents a half kilogram (1.1 pounds) in Batavia; and at that time the dry native rubber brought 16 to 18 guilder cents, of which 10 cents was restriction tax. It is probable that the native producers are not well satisfied, under these conditions, but they are more or less inarticulate. By means of successive ordinances the tax rate has again and again been redistributed between dry rubber and wet or "all other" native rubber and modified, too, to meet current market conditions; the present rate is 9 guilder cents per half kilogram of dry rubber.

The government, in pursuance of announced plans, expects to use proceeds of the native export tax for the financing of public improvements in native districts and reduction of other native taxes; equitable distribution of funds in the native districts would be hard to manage. There has been talk of an export tax, for revenue, on estate rubber exports; if this should be made effective, doubtless an equivalent part of the tax proceeds from native rubber would be used for the same purpose. Meanwhile the government has been attempting to have the rubber trees of native producers counted, with a view to testing the merits of a policy of individual restriction in certain native districts. At the same time the government may be closely observing the British state of Sarawak, in northwestern Borneo, where restriction took the unique forms of an embargo on the export of some low-grade types of rubber (this embargo was withdrawn, January, 1935) and the decree of tapping holidays of such length and at such intervals as may prove necessary to keep exports within the specified percentages.

The International Rubber Regulation Committee held several meetings in the process of deciding on the permissible export percentage of the basic quotas for the first quarter of 1935. Prices, which had varied with the course of industrial recovery throughout the world and with international exchange rates, as well as with restriction rumors, continued unsteady under the actual working of restrictions. Beginning at 3.08 dollar cents a pound in January, 1933, New York market prices rose almost uninterruptedly until August, 1934. At this time, when the price had reached 15.47 dollar cents (9.10 gold basis cents) a pound, the recession in American business activity, together with Siamese non-ratification indicating that the restriction program was not running smoothly, caused the market to weaken. The British representatives, apparently desiring a higher price, wanted a lower percentage for the first quarter of 1935 than for December of 1934, and the Dutch wanted a higher percentage, apparently counting on it to reduce prices and decrease native exports, known to be 14,000 tons in excess of permissible exports for the first four months.

The Dutch point of view prevailed. After several meetings the International Committee fixed the percentage for January, February, and March of 1935 at 75.

At the year-end, the combined actual exports of restricted areas during the preceding seven months were found to have fallen below permissible exports, but, with the unimportant exception of Burma, the variations were within 5% excess and 12% deficit provided under the agreement. Shipments were speeded up toward the year-end to prevent loss of export rights, contributing to weakness of the market. Toward the end of the first quarter, since prices had continued to fall, the percentage originally announced on February 26 at 75% for the second quarter was revised. On March 26 the International Committee set the rate for April, May and June at 70% and the rate for the second half of the year at 65%. The Netherlands Indian government at once decided to maintain the percentage at 75 instead of 70 through the second quarter, but to keep the balance by making an additional 5% reduction in the third quarter. In New York the announcement of the lower percentages immediately brought an advance of 1¼¢ a pound in the price of rubber futures, as the intention of the International Committee to effect a sizeable reduction of world stocks this year became clear. But the price of crude rubber in early April, 1935, after nearly a year of restriction, was lower than in April, 1934.

The International Rubber Regulation Committee is charged with a complicated and exacting task. It must not only administer and enforce the present Intergovernment Agreement, but must be prepared to make suggestions and recommendations for the future. It has definite access to advice from manufacturers, as the group in control of the Stevenson Restriction Scheme did not; for the agreement contains a clause providing that the International Committee shall invite the body or bodies it considers most representative of rubber manufacturers in Europe and America to nominate three persons representative of such manufacturers, and that such representatives shall form a panel who will be invited to tender advice from time to time to the committee. This provision, when made public, was objected to by Sir Eric Geddes, who felt that British manufacturers should have direct representation on the committee.

Curiously enough, the United States, which was the consumer par excellence a dozen years ago, uses scarcely 50% of the world's rubber today. At the same time American interests bid fair to become more important in rubber production. Perhaps, in the view of some observers, their recent developments already have that status; for, it will be remembered, the omission from the agreement of countries like Liberia and Brazil with American-owned plantations was criticized. Among parties to the agreement, to be sure, the general feeling seems to have been that these countries would long be negligible factors in the world rubber situation. At the same time, as a check on them and all other outsiders, the agreement absolutely prohibits the export of rubber seeds, buds, twigs, branches and roots.

The effect of this Intergovernment Agreement is, together with its significance, problematic. With trade in rubber fairly active and rumors of restriction afloat, the price had been rising for a year before the agreement was made. In the first quarter of 1935, however, prices were lower than through the last half of 1934. This is due in part to continued heavy arrivals of rubber in consuming markets, partly from the threat of rubber strikes in Akron, but mostly because of instability of international exchange rates for the pound, the dollar, and the guilder. Lower estimates of 1935 rubber consumption were another factor.

"The outlook for the [British] rubber-share holder is not so promising as was . . . thought probable during the early part of the year," cautiously observed the *Manchester Guardian*, in March, 1935, "but there is no reason to suppose that efficient and well-managed estates will do any worse than for the past year." In other words, at the prices prevailing from June to December, 1934, es-

tates in Malaya, where the currency fluctuates with the British pound, are on the average able to earn profits and to pay fairly good dividends; and, though at this writing prices do not yet equal those of April, 1934, the recent downward trend appears to be at least arrested.

The provision in the Intergovernment Agreement for a conference under British leadership to consider the status of the agreement after 1938, points to the possibility that the present 4½-year term of restriction is merely to be introductory to a period of indefinite length, if this can be arranged. Consequently short-term price trends are not very important.

Netherlands India has adjusted export percentages from time to time to accord with normal seasonal production trends and facilitate labor adjustments. Partly because the guilder is on a gold basis, the Netherlands Indian estates are probably not doing so well as estates in Malaya. Further, the Netherlands Indian natives have been exporting above their quota, and whether they will remain complaisant with control through the export tax continues to be debatable; their government expects to know by next year whether any other form of control will be practicable.

In the United States, where had been accumulated most of the surplus rubber stocks of the world in early 1933, there is always some uneasiness about prices and supplies under the policy of intergovernment control. The advance in price during the past year, however, has been slight and unsteady and due to several factors besides restriction. The price trend thus far resembles in broad outline the price trend during the early period of the Stevenson Scheme. As for shortage, there is at present no sign of any. Rubber stocks are still plentiful, and the tires distributed among dealers or stored in warehouses of the leading companies are reported to be more than sufficient to last through the spring and early summer months. However, this scheme should be studied more for long range trends than for short terms. An increased demand for reclaimed rubber, which began late in 1933, and a certain interest in all data (whether of American or, in particular, of Russian or German origin) on synthetic rubber and natural rubber from new plants suggest that ultimate possibilities are not being ignored.

With the price aim of the producers uncertain, with the market subject to creation of a position (in terms of months' supply of the commodity) that may facilitate manipulation by speculative elements, with the smaller producing countries craving revised basic quotas, and with international exchanges in turmoil, the prospect as to prices remains unsettled. Will the International Committee maintain a policy of judicious moderation, and will unequal division of allotments by the restriction officials of the various governments continue to satisfy native producers and small holders? Fear of contingencies unforeseen or inadequately provided for motivates producer and consumer alike, both inside and outside the agreement. Whatever opposing rubber interests may think of restriction, they are agreed on this point, that the future prosperity of the industry depends on discovering or creating new uses for rubber.

On another point, also, most of the Europeans among them seem to be in a quiet way agreed: that such prosperity as there is, may desert the large estates of western planters for the smaller but much more numerous gardens of native producers unless native production is unceasingly curbed. Whether the Intergovernment Agreement is merely an example of planned economy in a period that leans toward planned economy programs or a definite rear-guard action of European estates against native producers is indeed a moot question.

A test case for coöperative control of commodity output is at any rate in some sense involved, and a test case for human character as well. Let the agreement mean what it may, however, the parties to it will be none the worse off for recalling, in the words of an observant Englishman, that "the goddess of rubber delights in the unexpected, and finds sport in the discomfiture of her prophets."

Annals of Rubber

(*Continued from page* 30)

Goodyear Tire & Rubber Co., Akron, O., started a rubber plantation in Siantar, Sumatra.

Bulletin of the Rubber Growers' Association was established, published monthly in London, England.

The Research Association of British Rubber & Tire Manufacturers was registered in London to promote research and scientific work that may be of use to rubber, tire, and kindred industries.

1920. It was learned definitely that synthetic rubber, known as "methyl rubber," was largely used in Germany during the World War.

1921. Geer-Evans oven was introduced as a means for making accelerated aging tests of vulcanized rubber by heating it in air.

Institution of the Rubber Industry was organized in London, England.

(*To be continued*)

Industrial Gas Masks

(*Continued from page* 29)

vent undue effort on the part of the mask wearer in dragging it after him. The U. S. Bureau of Mines has set up certain valuable standards as to the crushing load which such hose must withstand and also the pull load which it must take without parting. The latter test includes the firm attachment of the hose unions to the hose. This Bureau has also set a standard of "oil resistance" since so many hose masks are used in tank cleaning operations in the petroleum industry.

In self-contained breathing apparatus the mouth bit is of rubber to form a comfortable bite for the teeth and flexible and comfortable seal between lips and gums. The breathing bag, or air reservoir, is of rubberized fabric. Corrugated tubes of rubber are also a part of this type.

Vast studies have been made in compounding rubber since gas masks first came into general industrial use just after the war. Antioxidants permit the making of masks which will last many times longer than those formerly used; the compound does not age so quickly. Sunproof ingredients lessen the surface cracking of the rubber when masks, with their molded parts, are used in tropical or semi-tropical climates, and other ingredients now permit compounds far more resistant to the deteriorating effects of the industrial gases than formerly.

In the present state of perfection gas masks are considered by most industrial plants as a necessary part of their safety equipment. Even though their operations are foreign to those of a chemical process nature, they recognize the value to human life in case of accidental emergency.

EDITORIALS

Social Security Cost?

THE question has been raised as to what effect, if any, the federal Social Security Act would have on the many types of most efficient and beneficent company-sponsored pension, unemployment, insurance, and mutual benefit plans that are now and have been in existence for many years, supported by specific contributions of employes, of company, or both. Most replies have shown that little interest or concern has been entertained regarding the act.

This statement, however, is not true of the General Electric Co. It has answered the question with decision, the kind that has been feared. President Gerard Swope announced November 22, in part, as follows:

"General Electric's unemployment compensation plan into which employes and company have contributed more than $7,000,000 in the past 5½ years to care for its workers during the years of the depression, will terminate on December 31, at which time the federal Social Security Act becomes effective."

Looking Forward

WHEN consideration is given the fact that substantially more than half the rubber consumed in the United States finds its way into automotive products, it can be appreciated readily that automobile production is a very sensitive barometer of the activity in the rubber industry. With this thought as a premise it is interesting, indeed, to review the car registration prognostications appearing in a recent report of the American Petroleum Institute which summarizes a survey of the present position of the petroleum industry and its outlook toward the future. The statement is as follows:

"Our calculations conclude that population will increase from the 122,775,000 of 1930 to 146,000,000 in 1960; that by 1960 there will be 31,100,000 passenger cars, as against 22,400,000 in 1935; and 6,000,000 motor trucks in 1960 as against 3,600,000 in 1935; total passenger cars and trucks in 1960, 37,100,000 as against 26,000,000 in 1935."

Because of the reputation for conservative accuracy of forecasts established during the past ten years by the American Petroleum Institute these predictions should be significant with regards to the probable continued expansion of the rubber industry during the next twenty-five years.

Business Codes

EVEN though general sentiment seemed to be against industrial codes at the time of NRA banishment, the intervening six months and the installation of numerous questionable business policies by some institutions have evidently brought about a changed trend of thought. Following the collapse of NRA, May 27, 1935, little, if anything, of consequential importance was done by leaders in the rubber industry to establish a basis of fundamental business soundness for large and small operators alike.

Many executives have voiced the conviction that a leader is lacking that can and will think and act impartially for the good of the industry as a whole to direct into existence regulatory plans of fair and considerate business conduct. This is, perhaps, also true of most other industries and may explain the overwhelmingly favorable response by representatives of management, labor, and consumers to the invitation of President Roosevelt, through Major George L. Berry, Coordinator of Industrial Cooperation, to attend a conference at Washington, D. C., December 9, 1935, to agree on the best means of accelerating industrial recovery and the elimination of unemployment. In the same correspondence the President expresses the hope that industrial groups will avail themselves of the privilege of effecting agreements as to minimum wages, maximum hours, the prohibition of child labor and of unfair competitive practices that will have the approval and cooperation of that most fair and active agency of the government, the Federal Trade Commission.

By this plan Major Berry and the Federal Trade Commission are offered to each industry to aid and direct the formulation of regulatory plans. The response of 5,300 industrialists is summarized by Major Berry in these words:

"Seventy-three per cent of the replies are unqualified acceptances of the invitation to attend the discussion. Twenty-three per cent have been classified as non-committal—the writer either wanted to know more about the program or was obliged to delay his reply until the proposal could be discussed with his associates. Only 4% can be regarded as expressing opposition to the plan."

D C McRoberts

EDITOR

What the Rubber Chemists Are Doing

Determination of Free Sulphur in Rubber[1]

A. F. Hardman and H. E. Barbehenn[2]

THE volumetric method described below is rapid, accurate, and distinguishes between true free sulphur and organically combined sulphur. It should be useful not only in the rubber laboratory but wherever small amounts of free sulphur must be accurately determined.

Volumetric Method

It was recently observed in this laboratory that when a clean surface of metallic copper is exposed to sulphur dissolved in acetone, the sulphur is quickly and quantitatively absorbed with the formation of a black film of cuprous sulphide. When no interfering substances are dissolved in the acetone in addition to the sulphur, the copper may be weighed before and after reacting with the solution and the sulphur obtained by the difference in weights. However in the extract of a rubber sample almost invariably will be found interfering materials such as the acidic softeners usually employed, certain accelerators and antioxidants, and even the natural resins of the rubber itself. Certain of these are absorbed or react sufficiently with the copper so that high results are obtained by direct weighing. An indirect method, therefore, must be used. Such a method was developed, based on the discovery that hot, concentrated hydrochloric acid attacks and completely removes the film of sulphide from the copper with the quantitative evolution of hydrogen sulphide. The latter is absorbed and determined by titration with standard iodine or preferably with iodide-iodate solution in a manner similar to the well-known method for sulphur in iron.

The form of copper best suited for this procedure was found to be gauze of about 40 mesh, cut into narrow strips about 0.6 cm. (0.25-inch) in width and 45 cm. (18 inches) long. The strip is then wound about a pencil to form a loose spiral about 2.5 cm. (one inch) in diameter, which weighs slightly more than 4 grams and has by calculation a surface of more than 65 sq. cm. (ten square inches). One such spiral, cleaned with boiling, concentrated hydrochloric acid, and rinsed with water and acetone, is dropped into each extraction flask with the acetone when the extraction is started. Any form of extraction apparatus may be used, or the rubber sample may be simply boiled under reflux in the acetone with the copper spiral. The sulphur is continuously removed from the solution by the copper until the reaction is complete. The copper spirals may be used for many determinations.

Procedure

The rubber samples are weighed out, wrapped in filter paper, and placed in the siphon cups of the Underwriters' type of extraction apparatus. The size of the sample should be regulated according to the probable amount of free sulphur present. For vulcanized, non-blooming tire stocks, samples of one to two grams are satisfactory. A spiral of clean copper gauze prepared as described is placed in the flask with 50 cc. of acetone, and the extraction carried out for six to eight hours. The acetone is then poured off the sulphurized spiral, which is rinsed with one or more portions of fresh, hot solvent until free of soluble resinous materials. If any cuprous sulphide is seen to have scaled off the spiral, the rinsing must be done carefully so that the sulphide particles are retained in the flask with the spiral. The flask and contained spiral are then dried in the oven at 60° to 80° C., and the flask is connected with the gas-evolution apparatus.

This consists of a two-hole rubber stopper, fitted with a thistle and a delivery tube, which is forced tightly into the neck of the extraction flask with the end of the thistle tube extending almost to the bottom of the flask. The delivery tube is connected to a small wash bottle and the latter to a second tube extending about 3.8 cm. (1.5 inches) below the surface of an ammoniacal cadmium chloride solution in a second flask. This solution is conveniently prepared by dissolving ten grams of cadmium chloride in 200 cc. of water and adding 300 cc. of concentrated ammonium hydroxide solution. Ten cubic centimeters of this solution, diluted as required, are used for each determination.

The gas evolution is accomplished by pouring twenty cc. of concentrated hydrochloric acid through the thistle tube into the flask and placing the latter on an open hole on the steam bath. The hydrogen sulphide is quickly evolved and carried over with considerable hydrogen chloride through the wash bottle into the absorbing solution. The wash bottle should contain a little concentrated hydrochloric acid which will maintain an approximately constant strength and volume as the hydrogen chloride gas is bubbled through it. After five minutes on the steam bath the apparatus is removed, and a gentle stream of air is passed through it for one minute to sweep all remaining traces of hydrogen sulphide into the absorbing solution. Care must be exercised to maintain the absorbing solution in an alkaline condition, since too much heat or too prolonged an air treatment may carry so much hydrogen chloride over that the cadmium chloride solution will become acid and no longer absorb the hydrogen sulphide.

The delivery tube is then disconnected from the wash bottle, and 0.04 *N* potassium iodide-iodate solution is measured from a buret into the still alkaline absorption mixture to an estimated slight excess, judging by the amount of cadmium sulphide precipitated. Ten cubic centimeters of concentrated hydrochloric acid are then added all at once, and the mixture is shaken. If the color of the iodine disappears, more iodide-iodate solution is added until a permanent yellowish tint is obtained. After about a minute starch indicator is added, and the excess iodine is back-titrated with 0.04 *N* thiosulphate solution.

To test the accuracy of the method a prepared solution of 0.2-gram of sulphur in 500 cc. of acetone was used. Six 25-cc. portions of this solution, each containing exactly 0.01-gram of sulphur, were transferred to clean flasks, and into each was introduced a prepared spiral of gauze. The flasks and contents were allowed to stand in a warm place overnight, but were not refluxed, since the block tin coils of the rubber extraction apparatus available appeared to be slightly contaminated with sulphur and might have caused high results. In the morning, after testing the acetone with clean copper gauze and finding it free of sulphur, it

[1] *Ind. Eng. Chem.*, Analytical Ed., Mar. 15, 1935, pp. 103-104.

[2] Kelly-Springfield Tire Co., Cumberland, Md.

was poured off, and after the flasks and spirals were dried the sulphur was determined as described. The sulphur values obtained for the six samples were 0.01007, 0.00995, 0.01010, 0.00990, 0.01007, and 0.00998; average, 0.01001.

The advantages of the new method for free sulphur may be summarized briefly as follows: much faster than previous methods; more accurate than older methods in the presence of organic sulphur compounds; and eliminates bromine or nitric acid fumes in the laboratory and does away with a large amount of equipment in beakers, funnels, crucibles, and filter papers.

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Rubber in Paints and Varnishes[1]

THE following is the most recent information on work of Henry P. Stevens & Son, consulting chemists to the Rubber Growers' Association, who have been conducting investigations under the auspices of the Association's Technical Research and Development of New Uses Committee into the improvements which might result from the incorporation of rubber into paints. The processes evolved are now patented[2] and vested in the Rubber Producers Research Association.

As a result of previous publications,[3] it is well known that oil gloss and particularly flat paints which contain a small proportion of rubber have greatly improved flowing and non-settling properties. A flat paint made with a medium containing equal parts of rubber and oil requires no stippling to produce a smooth surface, but will flow out perfectly when brushed on; while pigments which quickly settle out to a hard cake in a plain oil medium can be used in the oil-rubber medium with much greater safety. These rubber paints soon become dust dry after brushing out, but also have the advantage of "keeping open," thereby enabling the decorator to brush out a large surface without fear of the paint drying up at the edges and so preventing a clean "join up." Adhesion is also good, and the paints can be used equally as well for undercoatings as they can for flat finishes. For undercoatings the oil can be replaced by ester gum if desired. A quick drying hard finish thus is produced.

Although it is in flat paints and undercoatings that rubber can be used most advantageously, it can also be added with advantage to ready-mixed oil paints. The addition of 15 to 20% of rubber on the oil will improve the flow and eliminate the brush marks, with the result that the gloss is also enhanced. Thus a much improved ready-mixed standard linseed oil paint is produced.

Matters of first importance are the method of adding the rubber and the stage at which it is incorporated into the paint. The obvious way to add the rubber is in the form of a solution in the usual paint solvents. Raw rubber, however, gives extremely viscous solutions, and additions of only small proportions necessitate excessive thinning. Raw rubber also has a great tendency to cause the paint to thicken ("liver up").

These difficulties have been overcome by milling the rubber and adding a proportion of a paint drier (soluble or dispersible in the solvent). A solution of rubber much reduced in viscosity can thus be produced which, when added to a paint, does not cause "livering up."

Preparation of 50% Modified Rubber Solution (Known as Solution "B")

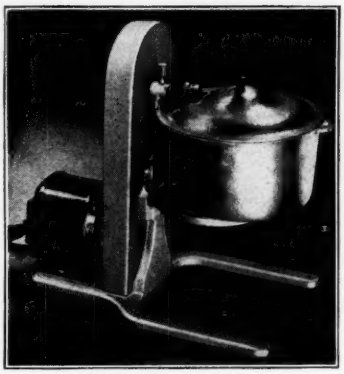
Raw crepe rubber is masticated on a rubber mill, using warm rollers, until the rubber runs coherently round the rollers. Keeping the rubber still milling, 2½% of Cobalt linoleate (6% metallic cobalt content) is then added. When the cobalt linoleate is completely dispersed in the rubber, the mixture is taken off the mill and immediately transferred to a solution mixer, and churned up with an equal weight of white spirit, until a homogeneous mass is formed. This is then poured into drums and is ready for use. The solution should not be kept at a lower concentration than 50%, as there is a tendency for thinner solutions to reduce still further in viscosity and to lose some of their properties.

Preparation of Paint Using Solution "B"

To prepare a paint the rubber solution is mixed to the oil with sufficient white spirit to make a medium, which, when mixed with the necessary pigments, will form a suitable paste for grinding. Any of the usual pigments and fillers can be incorporated. The ground paste is then thinned with further white spirit to brushing consistency.

[1] Publication of Rubber Growers' Association, 19 Fenchurch St., London, E.C.3, England.
[2] British patent Nos. 407,038 and 417,912.
[3] H. P. Stevens and N. Heaton, *Trans. Inst. Rubber Ind.*, 9, 247 (1934); *J. Oil & Color Chem. Asso.*, 17, 8 (1934).

New Machines and Appliances



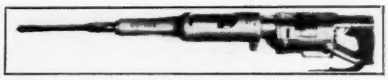
Club Aluminum Electric Homogenizer

Homogenizer

THE motor driven homogenizer represented in the illustration is a small, compact device of interest to the compounder of laboratory control batches of rubber latex mixings. It is especially adapted for use in developing new products. The model pictured is manufactured in six- and ten-quart bowl capacities. Its simplicity of construction renders it convenient to use, take apart, clean, and reassemble. Club Aluminum Products Co.

French Mixing Mill

BREAKING down crude rubber, mixing, and warming compounded stocks for calendering or tubing can be done with marked savings in time, power, and maintenance cost, and uniformity of results, with a newly developed horizontal roll mill in which the roll adjustments are constantly and automatically controlled by air and hydraulic pressure. Hydro-pneumatic shock absorbing devices are placed between the front roll journal boxes and the mill frames so as to work in conjunction with the adjustment screws to keep the rolls continuously in powerful but floating contact with the rubber load, thus assuring the maximum of masticating effect at all times. Le Matérial Spécial L.M.S.



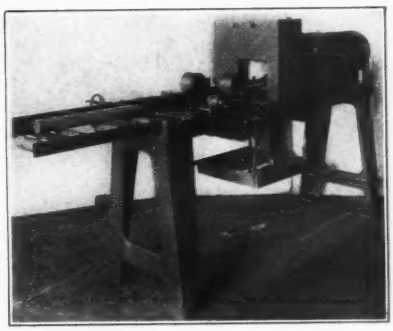
Wodack "Do-All" Drill and Hammer

Electric Drill and Hammer

A NEW idea in the construction of portable electric tools is embodied in this combination electric hammer and drill. The hammer mechanism is so constructed that there are only two working parts, both of which are made of specially treated steels to give long life. The motor is of the universal type with forced draft ventilation, and the tool may be operated from any light socket. By simply opening the chuck and loosening a cap screw, the hammer member may be removed and the tool used as an electric drill, with a capacity of ⅜-inch in metal. It may also be used as a portable grinder and buffer. When used as a hammer with star drills, the tool drills holes in concrete and masonry up to 1⅜-inch diameter, and by using special tools it does chipping, chiseling, cutting, and vibrating. This combination tool will be found useful by maintenance departments and installers of equipment using expansion bolts and similar concrete fastenings. Wodack Electric Tool Corp.

New Automatic Slicer

EXTRUDED stocks in cross-sectional dimensions up to three inches thick and four inches wide can be cut accurately in lengths from ⅛-inch to six inches with great rapidity. An automatic feed device, adjustable while operating, advances the stock, with precision, to the rustproof self-wetting disk cutter operating at 1,720 r.p.m. A 3 h.p. motor transmits power through a special gear housing to a central shaft which activates a crank shaft that drives the cutting blade.

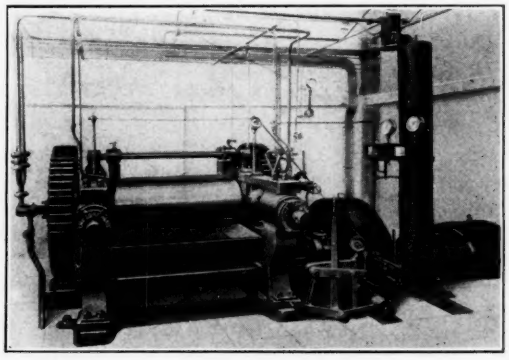


Utility Extruded Stock Cutter

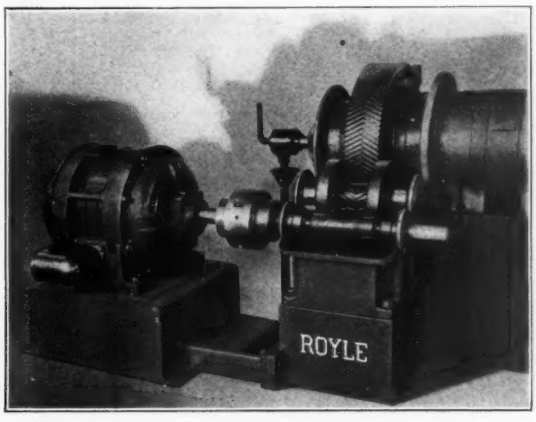
This machine is simple in construction, positive in operation, and designed for high capacity performance. Utility Mfg. Co., Cudahy, Wis.

Royle Tuber Improvement

THE accompanying illustration shows the new, sturdy, dual-gear drive mechanism of an eight-inch Royle tuber which assures troublefree thoroughbred performance. Here the drive shaft transmits its power to the intermediate speed reducing shaft by means of two herringbone gears so located as to be on opposite sides of the large herringbone gear which communicates with that driving the tuber worm. This design distributes the driving load in a manner to reduce gear and bearing wear to an absolute minimum and at the same time aids in offsetting thrust strains. John Royle & Sons, Paterson, N. J.



Hydro-Pneumatic Roll Adjustment Mixer



Royle Dual Gear Assembly

Gear Type Couplings

GEAR type couplings are applicable for drives where operating conditions do not necessitate the use of a resilient type coupling and where strength is the determining factor in coupling selection. Two general designs of gear couplings are described below.

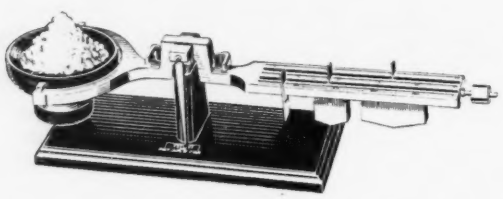
The Medium Duty coupling consists of two hubs, each provided with a set of external gear teeth. Each half of the vertically split housing is provided with a set of internal gear teeth which mesh with the external teeth on the hubs. These two sets of teeth are at the extreme ends of the coupling, and their action, together with that of the housing, permits the coupling to function, within limits, in the same manner as a universal joint and thus compensates for the usual errors of shaft misalinement, without creating destructive stresses in the adjacent parts of the connected equipment.

The Torque Ring coupling is similar to the Medium Duty design, except that in place of one set of internal and external teeth at each end of the coupling two such sets are provided. The hub and sleeve teeth do not mesh directly, but engage with internal and external teeth of a torque ring. This unique design provides double engagement at each end of the coupling, which greatly increases the misalinement capacity without increasing weight or length.

The torque ring design is built for shaft diameters larger than 3½ inches, as experience has indicated that the extra misalinement capacity provided by this design is not required on the smaller machines. John Waldron Corp., New Brunswick, N. J.

Accurate Balance

THE Chemical Publishing Co. of N. Y., Inc., claims that large-scale production and modern manufacturing methods make this compact chemical balance available at a trifling price. Its overall dimensions are: length, 10¼ inches; height, 2⅜ inches; width, 3⅛ inches. It weighs 14 ounces and is so compact that it can be carried in one's pocket. Its capacity is 100 grams; accurate to about a hundredth of a gram. There are no loose weights. The beam is of a die cast light alloy with a strong steel alloy knife edge contacting an agate bearing. The base and pan are Bakelite. This unique piece of apparatus is convenient for use in laboratory, factory, or field.



Bennett Balance

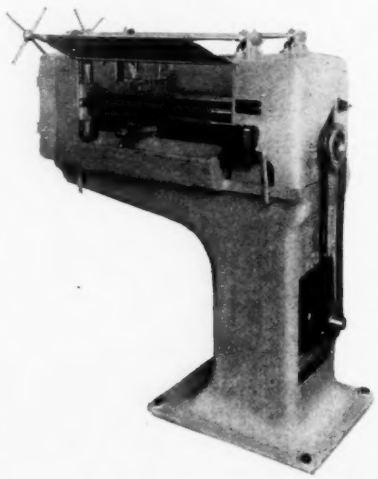
Koza Right-Angle Tool Attachment

Right-Angle Tool Attachment

PLANT machinery departments and tool room foremen will appreciate the convenience of the right-angle drilling tool device here pictured. It is adapted for use in narrow spaces and close corners on machine repairs where many hours must otherwise be taken either partly or wholly to dismantle a machine just to drill a hole or cut out some broken part. Designing of machinery, tools, and dies can be simplified by dependence on this and other angle attachment tools intended for use with angle drilling equipment. C. A. Koza, Inc.

Automatic Ring Cutter

SMALLER rubber disks and rings as bottle washers and the like are usually made in such a way that the tube or length is led through a guide of the required diameter with an intermittent movement, and then a rotating circular knife is moved back and forth directly in front of the guide device.



Müller Cutter

Thus the disks or rings are cut from the tubes. With this method of cutting there is always the disadvantage that the disks are not exactly even, and, moreover, they show grooves across the cut surfaces caused by the penetration of the rotating circular knife.

The new machine shown in the illustration works in such a way that the rubber tubes or lengths are advanced and rotated by rapidly revolving rollers, and then the disks or rings are cut off with a pointed blade. The rubber disks produced in this way are absolutely even and have perfectly smooth, clean-cut surfaces, as could never be obtained with the cutting process formerly in use.

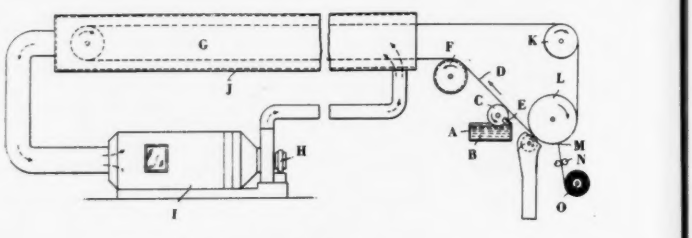
A special advantage of the new automatic cutter is that not only are the circular knives superfluous, but also the guides. The rings can also be cut by it without need of a support core or mandrel. Max Müller, Maschinen-und Formenfabrik.

Elastic Thread

A NOVEL method of producing elastic thread from rubber latex[1] is indicated by the diagrammatic sketch herewith, in which *A* designates a tank for an aqueous dispersion of rubber or latex *B* containing vulcanizing ingredients so that on subsequent drying and heating the rubber deposited from it will become vulcanized. Within the tank is a hardened printing roll *C* partly submerged in the fluid. The face of this roll is grooved. When the wall surfaces of the groove touch the face of the endless steel belt *D*, the fluid filling the grooves is transferred to the belt surface in the form of a laterally confined film. As the printing roll *C* revolves, the excess fluid is cleaned away by ploughs *E* so that the film presents sharply defined edges and is uniform. The advancing surface *D* is an endless stainless steel belt which travels over the idler *F* provided with grooves on its surface so that the films will not come in contact with it.

The films are dried and vulcanized by passing through chamber *G* through which heated air or gas is forced by a blower *H* associated with a gas heating chamber *I*. At the farther end of the chamber the belt is reversed in direction by passing around pulley *J*, thence around pulleys *K* and *L*. The vulcanized thread is stripped from *L* at the point *M* by the action of the pair of rollers *N* and reeled up at *O*.

[1] U. S. patent No. 2,001,781, May 21, 1935.



Latex Thread Apparatus

New Goods and Specialties

Latex Handle Wrap

A NEW use for latex takes the form of a handle wrap for tennis, squash, and badminton rackets and any other sport equipment having a handle. This "Sure-Grip" wrap, as it is known, weighs but half an ounce and comes in one size to fit all tennis racket handles. Many advantages are claimed for this device. It assures a positive, sure grip and prevents sore hands. It is free from objectionable odors and can be washed in hot soapy water. It is also said not to "unbalance" the racket. "Sure-Grip" comes in a variety of non-fading colors, light ones for women and black or bronze for men. Firelands Health Products Co.

"Sure-Grip" Handle Wrap for Rackets

Stormy Weather Footwear

WITH each new season the rubber footwear for inclement days grows more attractive than ever. See the accompanying illustrations. Are these galoshes not a far cry from the clumsy four- and six-buckle arctics of not so long ago? These 1936 models are beautiful, graceful—the desire of every woman who sees them—yet durable, serviceable, practical.

The Spiralshu is an entirely new style introduced this season. It is a "wrap-about" type having no fasteners; yet it readily conforms to all types of ankles and insteps. The fine faille rubber of the shoe appears in deep brown, snow white, and jet black. The matching fur comes around to the instep.

The 1936 Rayn-Tie is another swanky model. It features the laced-type closing with a full rubber front protector gusset under the waterproofed corded lacing. In the above three colors this rubber galosh has the matching fur trim around the top.

Luxurious to the *n*th degree is the Motor Boot, ideally suited to formal as well as informal wear. A velvet upper in black or brown is fur trimmed down the entire vamp. This boot also laces over a protector gusset.

These three numbers are flannel lined, making them comfortably warm even on the coldest days. Besides they are quickly put on or taken off. They are also slushproof. The heel heights offered are designed to fit over women's street shoes of various sorts.

Several other kinds of rubber galoshes, some fur trimmed, or laced or buttoned or with concealed talon fasteners, are available. Even the children's models are tastefully designed. The all-white laced fur trimmed rubber number will make every little girl wish for a pair for her "Sunday best."

The season's newest rubber is the Rayn-Anklet. Fashioned like a high riding oxford, to be worn over pumps, oxfords, and straps, it has no fasteners, yet easily slips over the leather shoe. Rayn-Anklet is net lined with the exterior surface of fine faille rubber. The upper portion is trimmed with suede. It is made in both black and brown for high Cuban or spike heels. Cambridge Rubber Co.

Rayn-Anklet

Dubble Cover Golf Ball

OF INTEREST to the average golfer is the announcement of a new golf ball designed to resist cutting without loss of distance. This "top-proof" ball, known as the "Dubble Cover," can stand abusive wear without ill effect, according to its manufacturer.

This extra durability without loss of distance is due to an entirely new departure in construction methods. The 700 feet of highest quality thread rubber in the "Dubble Cover" ball are wound at high tension for distance. The cover is designed for distance. But there's this difference between the "Dubble Cover" and all other golf balls. Over the winding and under the outer cover is an extremely tough, yet live and resilient undercover of balata, which acts as a shock absorber and reduces the danger of cutting by 50%—all without the slightest sacrifice of distance. The Crawford, McGregor & Canby Co., Dayton, O.

Spiralshu

Rayn-Tie

Motor Boot

New and Improved Golf Ball

Editor's Book Table

BOOK REVIEWS

"A.S.T.M. Standards on Rubber Products—October, 1935." Published by American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Paper, 204 pages, 6 by 9 inches. Illustrated. Index. Price $1.25.

This compilation, issued for the first time, is sponsored by Committee D-11 to afford a convenient laboratory standard test manual. It gives all the twenty-one A.S.T.M. specifications and tests for rubber products, a proposed specification now being considered, and a condensed bibliography. Included in the compilation are standardized procedures for the following: physical testing, tension testing, adhesion (friction test), hardness, abrasion resistance, chemical analysis, adhesion of rubber to metal, compression set, accelerated aging, flexing. Also covered by tests are rubber hose, both braided and wrapped construction, and rubber belting for power transmission. Specification requirements, including in most cases definite prescribed tests, are given for a number of rubber products extensively used, including: cotton rubber-lined fire hose, rubber pump valves, friction tape, rubber insulating tape, rubber gloves, rubber matting, rubber insulating blankets (proposed), insulating wire and cable (3) (Class A0 and Class A 30% Hevea rubber compound; performance rubber compound).

In the bibliography sources of information are given concerning properties and testing of rubber. While the list is not complete, an effort has been made to include comprehensive references and to give the more important of the recent publications.

"Handbook of Chemistry and Physics." Twentieth Edition, 1935. Charles D. Hodgman, Editor-in-Chief. Published by Chemical Rubber Publishing Co., Cleveland, O. Flexible leather binding, 1,966 pages, 4¾ by 6¾ inches. Price $6.

For twenty-two years the "Handbook of Chemistry and Physics" has been giving a unique service to those in need of accurate tables, formulae, and scientific data in a single convenient volume and will prove useful to the busy scientist and engineer and acceptable and highly essential in the commercial, educational, and research laboratory. This handbook is now accepted as occupying a field of its own and as being the only authentic guide and reference in the sciences relating to chemistry and physics.

In this edition the organic table has been changed from the tabular style to the paragraph or dictionary style. Instead of having to read across two pages to get complete data on a compound, all the data are in one paragraph, half a page wide. The most important constants such as melting point, boiling point, and density are indicated by bold face letters so that they can be picked out readily when only this information is wanted. This change in style has resulted in a considerable saving in space which has enabled the publisher to add data on over 1,100 compounds without increasing the total number of pages. The data in the entire table of physical constants of organic compounds have been revised, and the number increased to over 5,500. Seventy of the country's leading organic chemists have assisted in checking the constants and in supplying data on important compounds not formerly listed. A formula index of organic compounds has been added. This table is sure to be of great value to those interested in the study and identification of organic compounds.

In the interest of uniformity the twentieth edition contains the general rules and list of words with their recommended pronunciations, as reported by the Committee on Nomenclature, Spelling and Pronunciation of the American Chemical Society.

"Rules for Naming Organic Compounds" is a slightly abridged form of the Definitive Report accepted by the International Union of Chemistry. The table "Prefix Names of Organic Radicals" is in accordance with the latest rules of organic nomenclature. The collection of tables, "Properties of the Amino Acids," had been added, giving in considerable detail the properties of amino acids. Dissociation constants, specific rotation, and solubilities are included. This material will be of particular interest to biological and physiological chemists. X-Ray spectra, magneto-optic rotation and colorimetry sections have also been revised to date.

"More First Facts. 1935. A Supplement to Famous First Facts. 1933." Edited by Joseph Nathan Kane. Published by The H. W. Wilson Co., 950 University Ave., Bronx, N. Y. Cloth, 599 pages, 5 by 7½ inches. Chronological and geographical indices, also index by days to both volumes. Price $2.75.

Whereas the "Famous First Facts" recorded 2,500 first happenings, such as discoveries and inventions in the United States, "More First Facts" sets forth an additional 1,800 such "firsts." Here is a ready reference of useful and authentic information that has not been heretofore compiled.

"A.S.T.M. Standards on Textile Materials. Prepared by Committee D-13 on Textile Materials. Specifications Tolerances, Methods of Testing, Definitions and Terms. October, 1935." Published by American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Paper, 246 pages, 6 by 9 inches. Price $1.50.

This compilation of A.S.T.M. standards on textile materials gives all the thirty-seven standard specifications and tests developed by Committee D-13 and in addition provides other data and information in compact form that are believed important to all who deal with textile materials. The new edition of this book provides new or recently revised standards for the following: woolen or worsted yarns, asbestos yarns and roving, chafer tire fabrics, Holland cloth, hose and belt ducks, light and medium cotton fabrics, pile floor covering, testing fineness of wool, shrinkage in laundering of silk and rayon woven broad goods, strength test of rayon woven fabric when wet, general test methods for cotton fiber. A number of these standards are printed for the first time in the compilation.

NEW PUBLICATIONS

"Carbon Black—Servant of Industry. Catalog 135." Imperial Oil & Gas Products Co., Pittsburgh, Pa. This brief treatise covers concisely the production of carbon black and its industrial uses. Special mention is made of the different grades of black required for tire treads, mechanicals, footwear, and miscellaneous rubber goods lines. Grading and quality control of carbon black production is featured as essential for its special adaptation to the requirements of the rubber, paint, enamel, lacquer, and numerous other miscellaneous industrial uses.

"Rubber Peptizing Agent No. 1. Laboratory Report No. 193, October 15, 1935." E. I. du Pont de Nemours & Co., Wilmington, Del. The material discussed in this report constitutes a radical advance in rubber compounding practice as relates to softening rubber as contrasted with the common means employed. Through the use of "RPA No. 1" the plasticity of rubber may be controlled to degrees of softness ranging from normal masticated rubber to rubber that will flow at room temperatures, without prolonged milling and without adding softeners or diluents.

Rubber Industry in America

OBITUARY

John T. Spicer

JOHN T. SPICER, 47, former sales manager of the Thermoid Rubber Co., Trenton, N. J., was found dead in his garage, apparently from a heart attack, on October 31. Following his graduation from Exeter Academy, he was employed as a salesman for the Maddock Pottery Co., Trenton, and later went to the old Thermoid Rubber Co., where he was advanced in different positions and finally was made sales manager. After several years with Thermoid he became sales manager for Johns-Manville Corp., New York, N. Y., from which he resigned about three months ago. At one time he had been engaged in the advertising business with a Philadelphia concern. Mr. Spicer was a Mason.

Besides his wife he is survived by a son and a daughter and his mother.

Burial was in Riverview Cemetery, Trenton.

Wm. D. Gorey

WILLIAM D. GOREY, 63, died November 3, after a lingering illness. He had been a foreman for the Hamilton Rubber Mfg. Co., Trenton, for fourteen years and had been engaged in the rubber industry in Trenton for more than forty years, being employed by different concerns.

A widower, Mr. Gorey leaves two sisters.

Burial was in Holy Sepulchre Cemetery, Trenton.

Eugene R. Grasselli

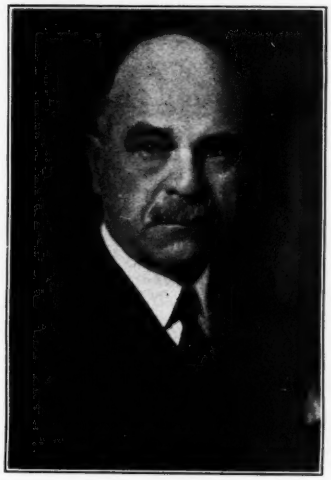
EUGENE R. GRASSELLI died suddenly of a heart ailment on October 5 in Santa Barbara, Calif.

A native of Cleveland, O., where he was born May 26, 1872, Mr. Grasselli was educated in private schools in Cleveland, completing his education at Mount St. Mary's College, Emmitsburgh, Md. He was the son of Caesar Augustin and Johannah Ireland Grasselli.

Eugene Ramiro Grasselli, his grandfather, trained in chemistry and engineering in German universities, migrated from Strasbourg, France, to the United States in 1836, and three years later founded what became The Grasselli Chemical Co., Cincinnati, O.

In 1867, E. Grasselli & Sons transferred their headquarters to Cleveland. Eugene Ramiro Grasselli was associated with the growth of their interests until his death in 1882.

Caesar Augustin Grasselli carried on the development of the rapidly growing business. The Grasselli Chemical Co. was incorporated in 1885.



Eugene R. Grasselli

Eugene R. Grasselli joined the company in 1890. His training followed practical work in the factory. In 1904 he was elected treasurer. In 1913 he was elected second vice president and treasurer and in 1916 first vice president and treasurer, continuing in that capacity until December, 1928, when the company became a subsidiary organization of E. I. du Pont de Nemours & Co. Mr. Grasselli retired from active business following the merger. His time has since been devoted to travel and following his personal interests.

Mr. Grasselli, connected with the Cleveland Public Library board for the past eighteen years, rendered very excellent service in connection with that very important civic enterprise.

Mr. Grasselli is survived by his wife, a daughter, a son, three sisters, a brother, Thomas, president of The Grasselli Chemical Co. since 1916; and a granddaughter.

Otto Meyer

OTTO MEYER, president and director of the Meyer-Brown Corp., rubber merchant, 347 Madison Ave., New York, N. Y., died November 5 after a brief illness. Mr. Meyer, born in Hamburg, Germany, November 28, 1874, came to this country forty-five years ago. He was a well-known lover of music and a member of the Fairview Country Club and the Commodity Exchange of New York.

His wife, three sons, and two daughters survive.

Lloyd E. Strobel

AFTER a nine-month illness Lloyd E. Strobel, for the last twelve years secretary of The Biggs Boiler Works Co., Akron, O., died October 1. He had been with Biggs since 1913, having previously worked in the local traffic office of a railroad company. He also acted as purchasing agent for Biggs.

Mr. Strobel was born in Akron, August 16, 1894. He graduated from Central High School in 1912.

The deceased was a member of the Masons and active in church work, having been a member of the North Hill Methodist Episcopal Church, where he was leader of the orchestra many years. He also belonged to the Akron Traffic Group, the Eskimo Club, Royal Arcanum Lodge and Ne Hta Chapter, O. E. S.

Funeral services were held at his church October 3. Burial was in Crown Hill Cemetery.

Surviving are his wife, two daughters, his mother, and a sister.

MIDWEST

THE Midwest also makes favorable comment on the business situation. In the Chicago metropolitan area the general level of light manufacturing is gaining. Several manufacturers of auto parts and accessories have been operating at better than normal for the season. Electricity output for the week ended November 9, highest of the year, rose 10.1% over the like 1934 week.

Practically all gains made in October in business in the St. Louis district were maintained in November. The annual automobile show had a record attendance, and dealers report more genuine prospects than at any of the others. Electric output to large consumers is contra-seasonal, running far ahead of last year.

Link-Belt Co. has moved its executive offices, for many years at 910 S. Michigan Ave., Chicago, Ill., to the Bell Bldg., 307 N. Michigan Ave.

The Kennedy Valve Mfg. Co., Elmira, N. Y., has appointed Frank De Witt & Co., 5736 Twelfth St., Detroit, Mich., as its representative in the lower peninsula of Michigan, including Detroit. This concern will handle the sale of Kennedy iron body and bronze valves, malleable iron and bronze screwed fittings, and cast iron flanged fittings and flanges for industrial plants and all kinds of buildings.

EASTERN AND SOUTHERN

RECENT reports on general business conditions in most sections of the nation were more optimistic. The general level of light manufacturing still rises in some industrial centers, with manufacturers of automobile parts, accessories, hardware and electrical equipment operating at better than normal for this season of the year. The unemployment situation was relieved slightly in some sections as PWA projects got under way. As an indication of improved industrial conditions, several large centers reported electric output to large consumers running far ahead of last year. Sharp gains in building operations stimulated business in general in a large number of areas. Textile plants are running at a high rate, and the iron and steel business is increasing; while tobacco manufacturers remain active. Pre-Christmas shopping is expected to be the greatest since 1930.

Another indication that factories are increasing activities is a statement by a rubber goods manufacturer to the effect that mechanical goods sales have bounded, especially for conveyer and transmission belts.

The United States Department of Labor reported that employment in September reached the highest level since November, 1930, and combined payrolls in manufacturing and nonmanufacturing industries were increased $12,000,000 a week over the August level. The payroll indicator was the highest recorded since May, 1931. The machine tool industry, a barometer indicating placement orders for power-driven metal cutting machinery, which has shown steadily expanding employment since October, 1934, continued to add more workers, to make the September employment index the highest since December, 1930.

New York State for September also noted gains in employment and payroll figures, greater than those of the corresponding period of 1934 and due to the seasonal upturn in trade.

W. B. Wiegand, director of chemical research, Binney & Smith Co., 41 E. 42nd St., New York, N. Y., on October 2 spoke to members of Mellon Institute, Pittsburgh, Pa., and interested specialists about carbon black.

National Association of Waste Material Dealers, Inc., New York Luncheon Club, inaugurated October 15 with a very successful luncheon, held its November luncheon at the Hotel Astor, New York, N. Y., November 19.

Huntingdon Mfg. Co., Meadowbrook, Pa., plans to resume manufacturing refined balata, cover shells, golf ball cores, etc., for the trade late in December. The firm indicates it will not manufacture golf balls complete under its own brands although it may eventually make them for others to market.

National Auto Show

The Thirty-fifth Annual National Automobile Show was held under the auspices of the Automobile Manufacturers Association, Inc., with the cooperation of the Motor and Equipment Manufacturers Association in Grand Central Palace, New York, N. Y., November 2 to 9. This is the first automobile show to be sponsored by these associations of manufacturers rather than the National Automobile Chamber of Commerce as formerly. The more important change, however, is setting the time of holding the show two months in advance of the customary date. This change was made in conformity with the suggestion of President Roosevelt with the object of effecting early purchase of new models, thus enabling car manufacturers to start production earlier and stimulate much needed winter employment. The success of this experiment depends on the buying response of the motoring public. The volume of sales realized at the show indicates consumer willingness to cooperate and make the experiment successful.

The models for 1936 are marvels of mechanical and artistic design; combining ease and safety of operation with the economy of power that comes with streamlining. In fact streamlining and brilliance of coloring expressly characterize all the car exhibits.

Du Pont Activities

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has won the 1935 award for chemical engineering achievement, donated by *Chemical and Metallurgical Engineering,* according to Albert E. Marshall, president of the American Institute of Chemical Engineers. Specifications for the award were that it be given for "the outstanding chemical engineering achievement since the last chemical exposition in 1933." The company won the prize "for successful large-scale production of the synthetic rubber 'DuPrene,'[1] synthetic camphor, and a variety of other essential organic chemicals and dyestuffs."

Homer H. Ewing, du Pont office manager in London, England, will be transferred to Wilmington as assistant director of the development division of the chemicals department, effective January 1. Henry E. Ford, assistant manager in London, will succeed Mr. Ewing as European representative. Caesar A. Grasselli, Wilmington, becomes assistant manager in London on December 1.

Du Pont named Chaplin Tyler an assistant director in the publicity department. Since 1927 Mr. Tyler has been with the company's ammonia department as chemist, research supervisor, and sales development manager. Before joining du Pont he was assistant editor of *Chemical and Metallurgical Engineering,* associate in journalism at Columbia University, and research associate in applied chemistry at M.I.T.

The Pierre S. du Pont High School, Wilmington, erected at a cost of $2,000,000, was dedicated November 6. Mr. du Pont, in whose honor the school was named, has given $8,500,000 for education in Delaware in the last twenty years. He spoke briefly at the dedication.

[1] Trade mark registered.

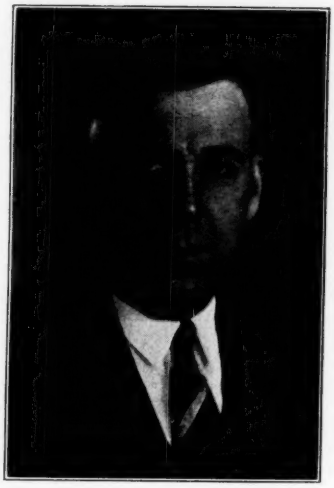
New York Rubber Brokerage Co., 166 Front St., New York, N. Y., through Treasurer Arthur Gottehrer announces that besides dealing in liquid latex and plantation and Para rubber, it has made a careful analysis of the requirements of the shoe, bandage, and paint and color trades and specializes in crude rubber for their particular use.

Commodity Exchange, Inc., 81 Broad St., New York, N. Y., has elected four new members: Sidney H. Strauss of Strauss, Phillips & Co.; Jacob C. Stone, of Asiel & Co.; Russell K. Laros, of the R. K. Laros Silk Co.; and Norman Godfrey, of Reiss Bros. The membership of Darwin S. York in the Exchange was sold recently to Henry A. Block, for another, at $1,700, $100 above the previous sale.

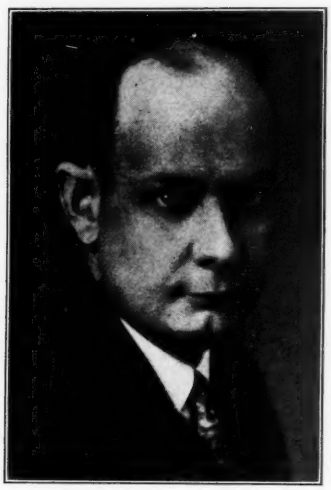
Rubber Trade Association of New York, Inc., 95 Broad St., New York, N. Y., on November 14 held its annual meeting at which the following were named to the board of directors for one year: Robert Badenhop, of Robert Badenhop Corp., reelected; W. E. Bruyn, of Littlejohn & Co., reelected; A. L. Grant, of Charles T. Wilson Co., Inc.; D. D. Haldane, of Douglas Haldane & Co., Inc., reelected; L. V. Keeler, of Avia Co.; Herman Muehlstein, of H. Muehlstein & Co., Inc., reelected; and D. A. Paterson, of H. A. Astlett & Co., reelected. Then the directorate met and unanimously elected the following officers for the ensuing year: president, Mr. Badenhop; vice president, Mr. Muehlstein; treasurer, Mr. Haldane. B. G. Davy was reappointed secretary-manager of the association. Mr. Badenhop prior to his election to the presidency for two years was vice president of the association, of which he is a founder member. Mr. Badenhop, who is also a director of Commodity Exchange, Inc., and director and vice president of the Commodity Exchange Rubber Clearing Association as well as head of the brokerage house bearing his name, last year celebrated his silver jubilee in the rubber business of New York.

The Fifteenth Exposition of Chemical Industries will be held the week of December 2 at Grand Central Palace, New York, N. Y.

Oscar Nelson Entertains at White Sulphur Springs



Oscar Nelson



G. A. Williams

The annual week-end party given by Oscar Nelson, president of the United Carbon Co., Charleston, W. Va., for his many friends and business associates was held at the Greenbrier, White Sulphur Springs, W. Va., November 9 and 10. Beginning a few years ago with an autumn tour of inspection, by some twenty-five or thirty industrial technicians, to the United Carbon Co.'s Research and Control and Industrial Development laboratories in Charleston, growth in numbers has occurred with each succeeding pilgrimage until the affair has taken on the proportions of a social event pleasing to the affable host and most enjoyable to the hundreds of invited guests. More than 540 attended this year, including 120 ladies, whom Mrs. Nelson entertained. Of the 540 more than half were men prominent in the technical and managerial affairs of the rubber industry; while others were equally representative of ink, paint, chemical, and transportation industries, also of banking, legal, and civic activities.

Guests came from all parts of the United States and Canada and from abroad. Of the latter were E. De Meens, representative of the B. F. Goodrich Co. in France; Lee Forest and wife, representative of the Goodyear Tire & Rubber Co. in England; and L. King, London, representing the Anglo Iranian Oil Co. Those from Canada, New England, New York, and New Jersey assembled in New York, N. Y., November 8, and were guests of Wm. W. Higgins, eastern district sales manager, at a cocktail party given at the Empire State Club and aboard the United Carbon Co.'s Special enroute via C. & O. to White Sulphur Springs and Charleston. Eleven Pullman cars and two diners were exclusively given to the comfort and further entertainment of this contingent. A sixteen-car Special served similarly guests from Michigan and Ohio, with Floyd Meyer, the United Carbon's Akron representative, as host. Chicago, St. Louis, and Cincinnati groups were provided with special cars attached to other trains.

Many of those from all points spent Saturday visiting the company's laboratories. Walter Grote conducted these groups to the Research and Control and the Industrial Development laboratories, where A. G. Roberts, chief chemist, and Dr. Emil C. de Stubner discussed the functions, problems, and equipment of their respective institutions. A visit to the executive offices was followed by luncheon at the Daniel Boone, after which the party returned by special train to White Sulphur Springs in time to join others in the planned festivities at the Greenbrier.

Separate banquets were given for men and women Saturday evening, followed by dancing in the Greenbrier Ball Room.

The men's banquet was opened with an invocation by Rev. Harold Rose, of New York. Following the elaborate dinner, Toastmaster William Clark, Monroe, La., director of United Carbon, introduced G. A. Williams, first vice president, who, in his address of welcome, explained the recreational tradition of White Sulphur Springs and gave that as the reason for its selection for Mr. Nelson's party.

He said in part, "It is hoped that you will relax and throw off all thoughts of business and give yourselves up completely to enjoyment, and to really knowing each other."

W. C. Hull, assistant vice president of the C. & O. railroad, principal speaker, spoke on the relation of railroads to industry and to economic conditions. Other talks were given in order by L. M. Buckingham, attorney and president of the Akron Chamber of Commerce; Harry L. Van Sickler, attorney and farmer; S. C. Coleman, banker, E. F. Hutton & Co., New York; Senator George H. Martin of Kentucky; and W. C. Revercomb, attorney of Charleston. Fitting tributes they were to both Mr. Nelson and his company. To these Mr. Nelson responded with well-chosen thoughts.

The ladies' banquet, with Mrs. Nelson as hostess, gave way to a style show in which Madame Madoc, renowned New York designer of gowns, modeled her latest creations along with hats by Sally Victor, also of New York.

The golf, tennis, riding, swimming, archery, trap shooting, and other recreational privileges so abundantly available at Greenbrier were participated in according to the desires of each individual. Most of the guests took advantage of the occasion to pay their respects to Mr. and Mrs. Nelson at their stately country home "Mörlunda," near White Sulphur Springs, where open house was held during the entire week-end.

At the invitation of Mr. Nelson those who could do so spent Armistice Day in the delightful surroundings of Greenbrier, leaving for their homes Monday night; others returned on the special trains Sunday night.

Commendation goes to Mr. and Mrs. Nelson for their hospitality and to all those of his staff that planned and conducted the details of such a pleasurable affair.

Aldan Rubber Co., Philadelphia, Pa., moved its New York, N. Y., offices and showrooms from 111 Fifth Ave. to 245 Fifth Ave., where James McLaughlin is in charge.

"Mörlunda," Mr. Nelson's Country Home

N. T. D. A. Convention

The fifteenth annual convention of the National Tire Dealers Association, held at the Hotel New Yorker, New York, N. Y., November 4 to 7, was attended by only a handful of dealers, and these representing Eastern cities. The name of the organization was changed to the National Association of Independent Tire Dealers, Inc.

Company-owned stores were the subject of severe criticism at every session of the convention, which went on record as favoring a Congressional investigation of distributing methods in the retail tire field. Encouragement was given this proposal by Senator A. Harry Moore, of New Jersey, principal speaker, who assured the convention delegates that they could count on his support of any program they submit to the government.

The independent dealers adopted resolutions calling for the discontinuance of company-owned stores, the holding of a trade practice conference under the supervision of the Federal Trade Commission, and the support by the independents of those tire manufacturers who do not directly compete with them in the retail field.

George J. Erlinger, New York, was elected president; J. J. Bradburn, Philadelphia, Pa., vice president; George J. Burger, New York, secretary-treasurer and general manager. These officers with the following compose the board of directors: Tom Lane, Jersey City, N. J.; Harry Nelson, Brooklyn, N. Y.; Joseph H. Walsh, Jacksonville, Fla.; George Eberhardt, Chicago, Ill.; Martin Barry, Baltimore, Md.; R. B. Callaway, Denver, Colo.; and A. B. Chapman, Los Angeles, Calif. Messrs. Lane, Bradburn, and Nelson were appointed the executive committee.

A trade show at which sixteen manufacturers of tires, tubes, and retreading and shop equipment displayed their products was a feature of the convention.

J. M. Huber, Inc., manufacturer of carbon blacks, clays, and pigment colors, 460 W. 34th St., New York, N. Y., through R. H. Eagles, manager of the pigment division, has reported the return of Chief Chemist I. Drogin from an extended tour of Europe where he visited most of the major rubber factories.

A. L. Viles, president and general manager of The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., on November 8 spoke over WOR and the Mutual Broadcasting System on the place of rubber in the automotive field.

The Johns Manville Sales Corp., 22 E. 40th St., New York, N. Y., and the **L. H. Gilmer Co.,** Philadelphia, Pa., recently entered a partnership agreement whereby the former will become sole sales agent in the United States and Canada for Gilmer fan belts and hose, effective December 1. The agreement relates only to Gilmer automotive products.

United States Rubber Co., 1790 Broadway, New York, N. Y., on November 8 asked the United States Circuit Court of Appeals in Cincinnati for a rehearing of its patent litigation with the Firestone Tire & Rubber Co., Akron, O. Acting on cross-appeals from lower court rulings recently, the circuit court held Firestone to be "substantially" the victor in the dispute.

Plant executives of U. S. Rubber held a dinner at Alexander Hamilton Hotel, Paterson, N. J., November 7 attended by almost a hundred guests including many industrial relations managers of the company's various factories, headed by C. S. Ching, general industrial relations manager at the company headquarters. The principal speaker was Vice President H. E. Smith. Among others present were R. G. Gartrell, W. H. Cobb, and C. L. Foutz, all of Passaic, N. J.; John Coe, Naugatuck, Conn.; A. C. Brown, Bristol, R. I.; and N. S. Madge, Providence, R. I. The dinner was brought to Paterson through the efforts of Walter D. Stearns, manager of industrial relations at the U. S. Rubber plant at Passaic.

United States Rubber Products, Inc., 1790 Broadway, New York, N. Y., has announced that twelve new safety school buses equipped with U. S. Royal Heavy Service tires were recently completed by the Crown Body Corp., Los Angeles, Calif., to be used by California municipalities in transporting students to and from school.

The semi-annual interplant tire division development conference of United States Rubber Products, Inc., was held at development headquarters, Detroit, Mich., the week of November 11. Technical representatives from the laboratories of each of the tire division plants attended. Among those present were Mr. Neville and Ray Kundinger, technical superintendents respectively of the Los Angeles, Calif., and Kitchener, Ont., Canada, plants. S. M. Cadwell, director of tire development, was in charge of the proceedings.

Borden's Farm Products Co., Inc., 110 Hudson St., New York, N. Y., in cooperating with Mayor F. La Guardia of New York in his anti-noise campaign is silencing its milk delivery by shoeing its horses with rubber shoes and replacing the steel rims on the wheels of its 2,000 wagons with pneumatic tires. Measures for sound reduction in connection with the motorized equipment also are under consideration. Borden's during the New York noise abatement drive of 1932 introduced the rubber insulated bottle carrier, instructed its drivers to wear rubber heels, and covered wagon chains with rubber wherever possible. The United States Rubber Co., 1790 Broadway, New York, N. Y., makes the new rubber horseshoes.

Struthers-Wells Co., division of Struthers Wells-Titusville Corp., machinery manufacturer, Warren, Pa., on November 16 moved its New York, N. Y., office from 285 Madison Ave. to R. C. A. Bldg., 30 Rockefeller Plaza.

NEW JERSEY

CALLS for rubber tiling have shown substantial gains during the month, with one factory operating twenty-four hours a day in filling orders. Colder weather is expected to create a better demand for rubber shoes. Some mechanical goods manufacturers report business holding up very well.

The Luzerne Rubber Co., Trenton, has let a contract for the erection of a chimney 150 feet high to cost $5,000, and will also erect an addition, 60 by 94 feet, costing $4,000.

Horace T. Cook, president of the Acme Rubber Mfg. Co., Trenton, and Mrs. Cook have been vacationing at Fishers' Island, N. Y.

Charles E. Stokes, Jr., vice president of the Home Rubber Co., Trenton, was made a member of the committee of the Trenton Red Cross Roll Call to secure funds from factories.

Whitehead Bros. Rubber Co., Trenton, is now running with three shifts in all departments except the rubber shoe division. Company officials are elated over the prospects for early winter trade.

Near Para Rubber Co., Trenton, reports that demand for reclaimed rubber increased during October and early November.

Jos. Stokes Rubber Co., Trenton, is operating both its Trenton and Canadian plants 100%.

Murray Rubber Co., Trenton, finds business has improved over last year.

Mercer Rubber Co., Hamilton Square, through President William H. Sayen announced business conditions have improved over last month.

The Thermoid Co., Trenton, is well supplied with orders. Joseph O. Baur, executive assistant, has resigned after over twenty-five years with the firm, having held various positions including being treasurer of the old Thermoid Rubber Co. He has no definite plans for the future and will enjoy a long vacation.

Pierce-Roberts Rubber Co., Trenton, continues to operate with two shifts. Harry W. Roberts, president of Pierce-Roberts, and also of Ewing Rubber Co., Trenton, vacationed in November along the Florida coast.

The Pocono Co., Trenton, reports that business declined a little during the warm early fall.

Essex Rubber Co., Trenton, finds business holding up well. October trade showed an increase over that of the same month last year.

Puritan Rubber Co., Trenton, is experiencing continued good business. Prospects are bright for the early winter months.

The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, has just brought out a second edition of its new general catalog published earlier in the year, for the unprecedented number of requests has completely exhausted the original edition. New bulletins also are available on the company's various belts.

OHIO

FROM Ohio comes the report that business conditions are quite favorable. The seasonal pickup that started in mid-September has been quite good. Some rubber plants are maintaining 50 to 60% operations. One drawback, however, exists. Owing to the adherence to the forty-hour week the remuneration of the individual is not sufficient; and where overtime operations are necessary, an employe who works more than forty hours one week must take time off the following one.

During the past month little change occurred in industrial operations, and in some lines activity remains at the highest level of 1935. New orders for machine tools again increased in October to bring those placed by domestic plants to the highest point for the year.

New Dual-10 General

A new type of automobile tire, said to be built on an entirely new principle in tire construction, was demonstrated November 21 to tire dealers from New York, Boston, Philadelphia, and vicinities who were assembled at the Commodore Hotel, New York, N. Y., at one of a series of sectional dealers' conferences being held by the General Tire & Rubber Co., Akron.

W. O'Neil, General president, L. A. McQueen, sales manager, and Frank Savage, New York branch manager, presided at the conference sessions which were followed by a dinner. Demonstration of the new tire, the Dual-10 with multi-vane tread, which has been perfected over a period of two years, was announced and described. By talking pictures and by actual demonstration it was shown that this tire will stop a car, straight in its tracks, more quickly on a wet pavement than any other tire will stop a car on a dry pavement.

The accompanying illustrations show how the tread of this tire is made up of many thin rubber flutes or vanes, running longitudinally around the tire. Because of their flexibility, these thin rubber vanes envelop, rather than resist, obstructions in the road surface. When brakes were applied hard, in an emergency stop, photographs through plate glass revealed these thin rubber vanes form a serpentine pattern on the surface, each rubber vane acting as a squeegee to wipe the moisture off a surface; so the adjacent vanes can cling to a substantially dry surface. This same squirming, squeegee action of the multi-vane tread forms a clinging non-skid tire surface on a dry pavement.

Similar studies show that all other conventional tire tread designs tend to close, under braking pressure, to form smooth, slippery contact surfaces susceptible to skidding. Heat tests in Florida and California are said to have shown the new tire accumulates less than half as much heat in running as other tires.

The General Tire & Rubber Co., Akron, recently arranged additional group insurance policies for its workers with the Equitable Life Assurance Society. The cost is shared by employer and employe. Several months back General provided for insurance of $1,000 each for employes without cost to them.

Firestone Tire & Rubber Co., Akron, has sold its footwear plant, Firestone Footwear Co., Hudson, Mass., to U. S. Rubber Products, Inc., subsidiary of United States Rubber Co., 1790 Broadway, New York, N. Y., at a figure slightly under $3,000,000. The Firestone plant has 244,000 square feet of floor space and is surrounded by much real estate besides employe dwellings and dormitories. Its daily capacity of 20,000 pairs of rubber footwear gives U. S. Rubber control of over 60% of such footwear production in America. U. S. Rubber is acquiring all the Firestone Footwear assets including accounts receivable and contracts now outstanding.

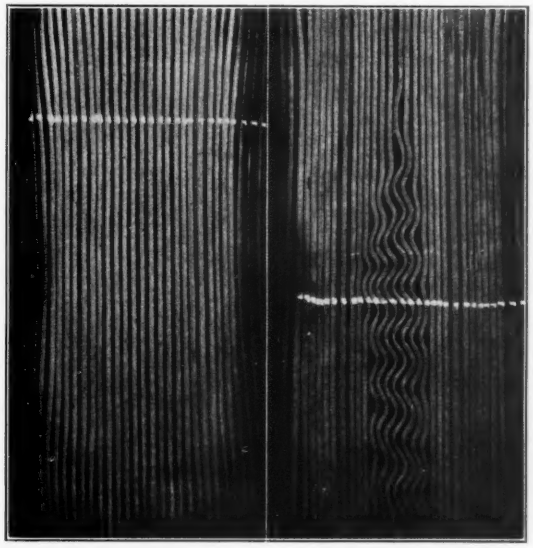
Goodyear Notes

Test Fleet

Transferring the bulk of its tire, road testing equipment, including sixteen cars and trucks, to Litchfield, Ariz., November 4, the highway fleet of the Goodyear Tire & Rubber Co., Akron, will this winter round out its twenty-second year of tire proving ground activity. The fleet's winter program in the Southwest, to be in a warm weather climate, since heat is an enemy of long tire mileage, necessitates moving a personnel section of forty-two men including drivers, two mechanics, a development engineer, and a stockroom clerk. Besides families of these men travel to the winter quarters in the drivers'

(*Continued on page 60*)

Cross-Section of Dual-10 Showing Thin Deep Multi-vaned Tread and Breakerless Construction Which Assures Pliability and Conformability



Loaded Car Running on ¾-Inch Glass Plates —Note Open Gripping Condition of Vanes in Road Contact Area

As Brakes Are Applied, Road Contact Increases, Vanes Squeegee and Open to Give Tremendous Gripping Action

NEW ENGLAND

IN NEW ENGLAND some plants are more active than they have been in five years. Several manufacturers of miscellaneous metal and machine parts, hardware, electrical equipment and allied lines report the betterment that started early last summer is continuing.

Textile plants continue operating at capacity. A better demand exists for cotton textiles; while prices are firm, and sales are exceeding production.

Reflecting recent betterment in the conditions in the rubber manufacturing industries of Rhode Island, payroll statistics compiled by the Brown Bureau of Business Research and employment figures of the State Department of Labor are very encouraging. Payroll distribution increased 8.1% over the corresponding month of 1934, and employment rose 2.4% over that of October, 1934. These figures indicate the continued improved demand for rubber products which has resulted in the major companies in this area now having virtually all their former employes back on the payrolls, according to company executives. Despite the uncertainty over the national politico-economic program, local rubber manufacturers are well satisfied with the present conditions and are confident that further gains are to come.

General rubber goods producers are well pleased with the current business volume and especially that in the rubberized thread division where capacity operations have been the rule for some time. Production, employment, and payrolls are all well above levels prevailing at the corresponding period last year; and one large plant reports that approximately two hundred workers have been added this fall. While executives expect a lull in the demand for rubberized thread as the inventory period approaches, with a consequent reduction of output, they point out that summer goods, such as golf and bathing equipment, slow at present, will show greater speed up with the new year and will tend to fill in the lag in other lines so that the average of winter operations will be satisfactory. Besides this activity in the thread department the Rhode Island rubber industry has experienced a steady business in industrial tank lining, which together with a smart pickup in sole and heel output has proved no small factor in the higher operating levels of leading concerns.

The sundries division has likewise experienced a gradual pickup since the advent of 1935, until in recent months plant operations have reached a full-time schedule and a capacity employment basis. This period is normally a busy one for making flat wear and surgical household goods as distributers lay in their winter supplies; so the outlook is for continued active production at least through mid-December. Manufacturers of sundries are especially encouraged by the fact that collections have been unusually good and by further improvement in the demand for higher quality goods.

Vultex Corp. of America, 666 Main St., Cambridge, Mass., to meet the increasing demand for its products and to improve its service in the Dominion, on December 1 opened a plant at St. Remi, Napierville Co., Quebec, Canada. Here will be manufactured and distributed ready-to-use compounds and natural and processed latex for the Canadian trade.

Charles J. Davol, for twenty-five years president of the Davol Rubber Co., Providence, R. I., on October 30 received congratulations of employes and business acquaintances on having served the firm fifty years. Employes presented him with a bronze statuette and a handtooled Florentine notebook, in which were the signatures of all Davol employes. Mr. Davol joined the company in 1885 and after several years was named general manager. In 1909 he was named president and treasurer to fill the vacancy caused by the death of Joseph Davol. Later he became managing director, which office he held until July 1, 1933, when he resigned and was succeeded by Ernest L. Kilcup. Mr. Davol is not alone in his record of long service as 15% of the several hundred employes have been with the company over twenty-five years and nineteen persons have served for more than forty years continuously.

Enterprise Rubber Co., 160 N. Main St., Providence, R. I. David C. Adelman, attorney of Providence, was appointed receiver by the United States Court for Daniel L. Goldman and F. Kantor, rubber merchants, doing business as the Enterprise Rubber Co. The receivership followed the filing of an involuntary petition in bankruptcy by the Davidson Rubber Co., the Purepac Corp., and the Mariette Doll Mfg. Co., creditors of the local concern. The filing of the bankruptcy petition stayed a sheriff's sale of the Enterprise Rubber Co.'s assets which had been ordered by the Sixth District Court on the petition of another creditor.

The Rhode Island Rubber Club will hold its next meeting December 5, 1935, at the Narragansett Hotel, Providence, R. I. Dinner will be served at 7.30. Dr. E. A. Hauser, associate professor of industrial chemistry at the Massachusetts Institute of Technology, will deliver a paper entitled "My World Trip of 1934-35." Walter Grote, of the United Carbon Co., will entertain the gathering with feats of magic. From 5 to 7 o'clock the club will hold a bowling tournament at the Washington Alleys, 109 Washington St. Prizes will be awarded those whose performances merit recognition. Some interplant matches have been arranged. Reservations for the dinner meeting at the Narragansett Hotel can be made with F. E. Rupert, secretary-treasurer of the club, Anaconda Wire & Cable Co., Pawtucket, R. I.

The Foxboro Co., manufacturer of recording, controlling, and indicating devices, Foxboro, Mass., has acquired an interest in the Atlantic Precision Instrument Co., Malden, Mass., manufacturer of the Verigraph, an electrical device which determines and controls the moisture content of paper, also the thickness of dielectric material, such as rubber, and which has already proved its great value in the production of paper and rubber goods. Albert Allen and Wilfred H. Howe, with Atlantic Precision for several years, have joined Foxboro. Mr. Allen's activities will be primarily in the sale of this equipment; and Mr. Howe will work in the research department.

Archer Rubber Co., Milford, Mass., on October 27 was considerably damaged by fire. Water from the sprinkler system and firemen's hose added to the damage. Loss was estimated at $20,000. The property is covered by insurance. About two hundred employes for a few days were unable to attend their regular duties, but many were put to work cleaning up the debris. President John T. Callahan after the fire, believed due to spontaneous combustion, said business was rather quiet although the company recently has been running with two and three shifts.

Plymouth Rubber Co., Inc., Canton, Mass., according to F. E. Harris, assistant general manager, has discontinued manufacturing rubber thread at its local plant, where machinery and equipment have been dismantled for shipment to the company's new factory under construction at Feyzin, France. Here the thread will be made in exactly the same manner as at Canton. The new company, to be known as Societe Plymouth Francaise, should be in production about January 1. President Ira M. Hamilburg and Edward Hughes, manager of the thread department at the Canton plant, have sailed to France to assist in the erection of the new factory.

"DuPrene" a Trademarked Name

Attention is directed to the fact that through misunderstanding the word "DuPrene," appearing frequently in "A Gigantic Test Tube," pages 31-33, and "AXF—A New Plastic Material," page 82, both in the November 1 issue of INDIA RUBBER WORLD, and on other occasions previously published, has not been properly characterized as the trademarked name owned solely by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Rubber Industry in Europe

Great Britain

At a meeting of the London & District Section of the Institute of the Rubber Industry, October 14, D. Baptie, of the North British Rubber Co., spoke on rubber footwear and showed a film of the entire process starting from the collection of the latex on the estate to the finished factory product. Mr. Baptie also reviewed the development of the rubber footwear industry which has proceeded so rapidly in recent years that at present the annual output of the United Kingdom is conservatively put around 20,000,000 pairs.

After discussing the history of the rise of the Wellington in the United Kingdom, the growing use of heavy industrial rubber boots, and the extraordinary popularity of the different types of rubber-soled canvas footwear, he described two recent developments, Dunlop's new seamless latex Wellington, in which latex is used direct, and a complete molded canvas-topped tennis shoe recently launched by the North British Rubber Co. The canvas shoe is made by enclosing in a steel mold while pressure is applied inside the shoe during curing by means of an airbag shaped like a last. The idea is new for canvas shoes, but about twenty-six years ago, Mr. Baptie said, he saw galoshes molded, when the most perfect overshoes he had ever seen were produced. They were in fact too perfect and too long-lasting to be profitable for the manufacturer, aside from the fact that the costs of large-scale production were so high that the proposition had to be dropped.

Discussing the merits of powdered rubber at the latest meeting of the Rubber Powder Co., Ltd., (which, it will be recalled, is to be liquidated, its assets and liabilities having been acquired by the International Powder Co., Ltd.,) Mr. Fordyce Jones, of the Reliance Rubber Co., stated he had been getting working samples of powdered rubber from every delivery, and each time he noted an improvement over the preceding delivery. He had no doubt that as soon as the value of powdered rubber was known, manufacturers would welcome it. Surprising savings were possible with this powder because of the ease of mixing. On some of the hard blocked sheet and crepe rubber which had been lying in cases at the docks two or three years as much as ½ to ¾ d. had to be spent to prepare it for use; whereas the powder could simply be tumbled out; it went on the mill without any peak load, and there was easily a 20% saving in milling costs.

At this meeting a variety of articles made from powdered rubber was shown, including tires, heavy mechanical goods, trays, mats, tobacco pouches, dolls, other toys, etc. As Mr. Fordyce Jones stated, the quality of the powder is being constantly improved. Its tendency to stick has been still further reduced, and now only ½% of zinc stearate needs to be added to prevent agglomeration of particles during transit; while 180 pounds can now safely be packed in a standard-size case. It is expected that the new, improved machinery being installed will lead to still further advances so that various grades suitable to the individual needs of the manufacturer will be obtainable.

The Henley Extrusion Machine Co., Ltd., was recently formed with a nominal capital of £20,000 in £1 shares to acquire from W. T. Henley's Telegraph Works Co., Ltd., patents relating to the manufacture of an extrusion machine and to carry on the business of iron founders, engineers, etc. The shares are divided in 10,000 A and 10,000 B shares, the former being allotted to W. T. Henley's Telegraph against payment in cash at par. The directors are Montague Hughman and Walter Bishop, chairman and director of W. T. Henley's Telegraph, respectively; William Travis, director of British Insulated Cables; Philip Vassar Hunter, advisory director of Callender's Cable & Construction; and Burkewood Welbourne.

Germany

At the eighth annual meeting of the Deutsche Kautschuk Gesellschaft held in Dresden, June, 1935, Hermann Miedel read a paper on the importance of latex in connection with the present policy of cutting down raw material imports. Latex itself is an expensive material that must also be imported, but Mr. Miedel shows its use permits economies in various directions and thus helps save foreign currency. Although latex is more expensive than rubber, the simplicity of its application in many cases and the fact that solvents (also imported) can be dispensed with give it preference.

In the textile industry impregnating threads and fabric with latex adds to their durability and thus in the long run saves material; lightweight fabrics, doubled with the help of latex, are peculiarly suited for linings and uppers of fabric shoes; belting of plies of latex-impregnated fabric equal balata belting which makes such heavy demands on foreign currency. It has been calculated that if in making plush or carpeting the threads are anchored to the backing with latex, a saving of about 25% in the cost of the backing can be effected; while the wear, appearance, and softness of the material is equal to that of ordinary plush or carpeting. At present the use of this material in Germany is prevented by the fact that the plush industry has not been allotted a quota of rubber, but a change is hoped for. In so-called artificial velvet finely ground fibers are sprinkled on to a latex-coated fabric so that the nap, otherwise the most expensive part, actually consists of waste material.

Artificial leather made with a latex compound offers several advantages over that made with nitrocellulose, which can be spread only very thinly, making several coats necessary. With latex a few coats suffice; no solvent is needed; comparatively little latex is used in the mix; and the product is just as good and costs less.

Toppings for insoles formerly were of soft leather, but are now made of a light fabric covered with a mixture of china clay and a suitable concentrated latex compound. In Germany between 1,000,000 and 2,000,000 square meters of this material are used annually.

Hitherto difficulties were encountered in producing leather substitute of ground leather and latex by the process used in making latex paper. The trouble was caused by the diversity of the leathers which have varying coagulating effects on the latex. Now, however, Metallgesellschaft has developed a method of "equalizing stabilization" which results in a stable leather-latex pulp that can be worked up on paper-making machines. By varying the rubber content materials of different degrees of hardness can be obtained.

Coating the back of paper-thin pieces of leather with a suitable latex mix gives them the thickness, feel, and pliability of high-grade leather. Ground cork waste, mixed with latex and spread to dry so that the individual particles do not adhere, can be pressed into any desired shape, and the articles have the qualities of good cork. Experiments on similar lines have been made with waste rubber. The ground waste is stirred with a concentrated latex compound so that each particle is covered with a still reversible, but almost dry, thin latex coat. This material is lightly pressed into a cohering mass which is then formed and vulcanized just like a milled rubber mix. In this way time and power are saved, and surprisingly uniform and close-textured vulcanizates are secured.

In the course of these tests it was further observed that no increase worth noting occurred in the tear and abrasion values when the proportion of new rubber was raised from 7% to 35%

(calculated on the old rubber), which is of special interest to German manufacturers today. A mix of ground tread waste and 7% latex (dry weight) was compared with a normal tread compound, and it was found that while the tear value of the former was considerably lower, the resistance to abrasion was hardly less than that of the latter. The product, considered suitable for soles, cycle tire covers, conveyer belts, etc., is expected to find widespread use in Germany.

Increased use of rubber-lined iron containers in the chemical and food industries would insure savings of such metals as copper and tin. The employment of latex for sealing covers of containers has so far made little progress in Germany, but should become more general to save soldering materials.

The problem of producing synthetic rubber appears solved in Germany, and now the first factory for its production, said to be in Piesteritz bei Wittemberg, is nearly completed so that operations are expected to commence this month.

European Notes

The Danish rubber footwear industry, which employs about 5,000 workers, is enjoying a mild boom, reflected in increased dividends and considerably improved share values of companies. Since 1931 Denmark's production of rubber footwear increased from 2,806,000 to 4,799,500 pairs. At the same time imports have been falling steadily, and in 1934 represented a value of only 890,000 kroner against 1,500,000 kroner in 1933.

Hungary is another of the smaller European states striving to become self-sufficient in regard to rubber goods. In 1934 production increased about 20%, and personnel around 10%. The first half of 1935 saw a small increase in exports as well as a slight decline in imports. The totals were: exports, 4,412 against 4,281 quintals; imports, 9,557 (2,167 quintals of manufactures and 7,390 quintals of crude and waste rubber and gutta percha), against 9,993 quintals. Tires, the chief imports, in 1935 totaled 1,228 quintals; whereas they constituted over 50% of the imports in the first half of 1934, in 1935 they were only about 41%. In addition were imported in 1935, 169 quintals of rubber thread, 142 quintals asbestos and rubber goods and It-packing, 106 quintals other technical goods, 161 quintals hard rubber goods. Most of the goods came from Austria, with Germany a poor second followed by England and Italy. French imports, which in 1934 had practically equaled those from Italy, were cut to less than one-fourth in 1935, and the already small shipments from Czechoslovakia dwindled to insignificance. The exports included technical goods, 1,259 quintals; soles and heels, 1,173 quintals; erasers and other soft rubber goods, 1,005 quintals; toys, 273 quintals; asbestos and rubber goods and It-packing, 202 quintals; seamless dipped goods, 191 quintals. An important change is noticeable in the destination of the exports. In 1934 more than one-third went to countries like Egypt, Roumania, Jugoslavia, and Turkey, that is eastern and south eastern countries; the decline was marked in shipments to these countries in 1935; while a corresponding increase occurred to West European countries, particularly Austria and Holland.

While countries like Denmark and Hungary are making themselves more and more independent of foreign imports, others formerly manufacturing chiefly for export have to cut production, as for instance Latvia. An article in *Gummi-und Asbest Zeitung* reminds us that when Latvia formed a part of Russia, it was the home of some of the best known rubber manufacturing firms there: the Provodnik, of world-wide repute, Kautschuk, and Mundel. The first firm alone used to produce 35,000 to 40,000 pairs of galoshes daily. The World War ruined these firms; but when Latvia became independent, the rubber industry picked up again, and for a period of years, up to 1929, the country again became an important producer of footwear. There are now three firms, with well-equipped and up-to-date factories: Varonis, Kwadrat, and Kontinent, all in Riga. They produce mainly galoshes and other rubber footwear, also cycle tires and tubes, fire and other rubber hose, toys, rubberized fabrics, and technical goods. Recently they have taken up automobile tires and rubber flooring. When at its peak, in 1928, production reached a total value of 18,355,000 lats, 1,474 tons, value 15,353,000 lats, were exported. After 1928 a rapid decline in production and exports set in so that by 1933 the output represented a value of only 5,821,000 lats and exports 2,435,000 lats. In 1934 the footwear exports were only 375 tons, value 1,418,000 lats. According to latest reports, the three firms mentioned are chief among the Latvian rubber concerns that have lately formed a joint selling company.

Import quotas of 450,000 square yards of rubberized fabrics and 500 articles of rubberized clothing were established by Irish Free State orders dated September 20, according to a report from Vice Consul Edwin J. King, Dublin. The quota period of the fabrics extends from November 1, 1935, through January 31, 1936; while that for the wearing apparel is for the period November 1, 1935, through October 31, 1936.

The Italian import duties on rubber gloves were increased by royal decree No. 1707, published in the *Gazzetta Ufficiale*, Rome, of October 1, 1935, effective from the date of publication. The revised rates, in lire per kilo (former rates in parentheses) follow: rubber gloves weighing 50 grams or less per pair, 47 (17.60); others, including parts of gloves, 37 (13.80).

Battery containers of hard rubber and similar materials, and all accessories for batteries are dutiable in Spain under tariff item 636 at 46 gold pesetas per 100 kilos, instead of the former rate of 1.50 gold pesetas per kilo applicable on most containers, in accordance with a *note verbale* of September 23, 1935, from the Ministry of State as reported by Commercial Attaché Albert F. Nufer, Madrid. These battery containers were formerly dutiable, under a circular order of the Director General of Customs, dated May 9, 1935, at the rate applicable on the kind of battery they were intended to contain.

In Soviet Russia it is estimated that tire production this year will reach 2,000,000, a gain of 230% over 1933. Rubber footwear production will total 75,000,000 pairs, a gain of 10,000,000 pairs over last year. Use of synthetic rubber, made from the Russian *tausaguyz* bush, jumped 200% this year to 24,000 tons.

A. C. S. Meetings

New York Group

The annual Christmas party of the New York Group, Rubber Division, A. C. S., will be held Friday, December 20, 1935, in the clubrooms of the Building Trades Employers Association, 2 Park Ave., New York, N. Y. The program for the evening will consist principally of entertainment, rather than serious features.

Boston Group

The Boston Group, Rubber Division, A. C. S., held its fall meeting at the University Club, November 19. Following the dinner, attended by 101 members and guests, a business meeting convened in which officers were elected for the coming year as follows: Dr. John T. Blake, director of the chemical department, Simplex Wire & Cable Co., Cambridge, Mass., chairman; and Dr. Royce J. Noble, chemical engineer, 56 Wilbur St., Malden, Mass., secretary-treasurer.

The paper of the evening, presented by Col. Walter T. Baker, consisted of an illustrated lecture on "Developments in Chemical Warfare," in which he described the various types of gas masks, chemicals, and equipment used in chemical warfare, and the points which the Chemical Warfare Department has observed when developing new chemicals and preventative equipment. All ingredients used in the chemicals as well as in the preventative equipment must be obtained on the American Continent to render the Army independent from overseas.

Raycote

Raycote, produced by the Rayon Processing Co. of Rhode Island, 83 Tremont St., Central Falls, R. I., consists of rayon evenly cut to form flocking fibers. This material can be used with latex in a new process of manufacturing artificial velvet.

Rubber Industry in Far East

CEYLON

Clone Rubber

An important note on clone rubber is included in the technical appendix to the report of the London Advisory Committee for Rubber Research (Ceylon and Malaya), published in the "1934 Report of Rubber Research Work in Ceylon." Samples of rubber from different clones in Ceylon were sent to London for examination during 1933 and 1934. In the former year rubber from two clones was tested; but as the trees were young, no conclusions were drawn concerning quality. However results last year from three clones confirmed previous findings and indicate a considerable difference in the quality of the rubber, for two of the clones yielded material distinctly superior to the third.

Many unsolved problems are connected with the quality of clonal rubber in the East, and little of the information so far obtained by various investigators has been published. Subsequent tests may prove that quality of rubber is hereditary, that agricultural, climatic, and other factors have considerable effect, and that inferior rubber can be rendered satisfactory by modifying preparation or manufacturing practice, but it is obviously undesirable that clones yielding inferior rubber in preliminary tests should be planted extensively until it has been shown that there is no risk of producing on a large scale rubber unsuitable for manufacturing high-grade articles without special treatment.

Budgrafting in Ceylon

Ceylon has lagged behind other important rubber producers in budgrafting, but in recent years the matter has been taken up more seriously, and good work is being done at the experiment stations and on various estates. During 1934 test tapping at the Nivitigalakele Experiment Station and various estates cooperating with the Rubber Research Scheme was carried out on 85 Ceylon clones, represented by 826 trees. Figures are given for the most promising of these, in all 138 trees, representing 13 different clones and ranging in age from 4½ to 8½ years, with the majority 7½ and 8½ years old. From the data it appears the best results were obtained from clones Wawulugala 259, Milleniya 113 and 191, Wawulugala 320, and Hillcroft 28 and 55. It is interesting to note that ten 7½-year-old trees of the first-named clone planted on Milleniya Estate and tapped 78 times yielded 14.5 pounds of rubber per tree; while the same number of trees, of the same age, of the same clone, planted on Wawulugala Estate, tapped on the same system, but 75 times, gave 11.3 pounds per tree.

A number of imported clones have also been established in Ceylon, and records of test tappings of young trees from 4 to 6½ years as well as of their growth are becoming available. An analysis of the data obtained shows that Tjirandji I is not only the quickest grower under all conditions in Ceylon, but is also the best yielder. However 10 trees of this clone, 5½ years old, on Minneriya Estate, gave 4.5 pounds of rubber per tree when tapped 25 times; while 5 trees of the same clone on Wawulugala Estate yielded only 1.8 pounds per tree when tapped 24 times on the same system, though the trees were 6 years old.

In accordance with a decision of the Board the Rubber Research Scheme should distribute budwood and budded stumps to small Ceylonese proprietors to replant existing areas. A nursery at Nivitigalakele was budded with 20 of the best imported clones; over 3,000 successful grafts were obtained. The budwood will be used for the new nurseries to be laid out in the Pinnagoda land.

Latex Experiments

Work in the Chemical Division included the continuation of trials on rubberizing hessian with latex to provide a more suitable material for woolpacks. The fibers of untreated hessian tend to contaminate the wool, and the tests were to find an efficient and economical method of anchoring the jute fibers. Trials were made by spraying latex of various concentrations, vulcanized and unvulcanized and also compounded, but so far no definite results have been obtained. M. W. Philpott, in charge of this work, will probably visit Calcutta to study the methods of the manufacture of jute from the point of view of treating it with latex.

Experiments have also been made in combining coir waste with latex. The coir waste was bleached to the color of straw and, when mixed with latex, sheeted and vulcanized, yielded an attractive product with promising physical properties. It is thought the material might prove suitable for flooring purposes; and after experimental equipment has been installed at Dartonfield, the investigation will be taken up in a more thorough and systematic manner.

MALAYA

Yield Predictions

Nothing could prove more convincingly, if proof were needed, the value of the work done by the Rubber Research Institute of Malaya than its journal for August, 1935. To begin with is the article on yield prediction in hevea, by H. Gunnery. Various attempts have been made repeatedly to find a method of determining the yield capacity of trees at the earliest possible period. Several years ago Ashplant, working in South India, tried to show a correlation between the bore of the latex tube and the yield of a tree. But his theory was not acceptable. Mr. Gunnery has gone a step further; he has studied the sieve tubes surrounding the latex tubes, and his findings indicate that if Ashplant was not altogether correct, he was at least on the right path. For Gunnery finds, and submits interesting plates to substantiate his findings, that the bore of the sieve tubes of low-yielding seedlings is markedly narrower than of high-yielding buddings; further, that narrow bore sieve tubes are associated with narrow bore latex vessels and large bore sieve tubes with large bore latex vessels. The plates also show the presence of a constant type of sieve tube in all parts of the tree and the advanced development of the sieve tubes of bark of one-year-old stems so that low-yielding plants could be discovered and eliminated at an early age. Naturally further investigation will be undertaken.

Clonal Seed

Investigators have always kept in view the fact that budding is not an end in itself, but a means to an end: the obtaining of authentic seed from proved clones which could be expected to give seedlings with as high a yield capacity as that of the clones so that they would unite in themselves the good qualities of the clone and the advantages of seedlings. Early tests indicated that such results were readily obtainable. However C. E. T. Mann in his paper, "Recent Progress in Selection of Planting Material of Hevea," states that it is possible by carefully controlled crossing of selected high-yielding parents to raise families of seedlings which, without further selection or elimination of the poorer individuals, are capable of yields at least twice as great as the yields obtained from ordinary unselected seedlings. The best families produced so far are capable of an average production closely approaching that of buddings of a good proved clone, but the highest

yield level attained by the best seedling family yet described does not reach that of the best proved clones. In other words, for many years to come proved clones will continue to be the planter's best bet, at least as far as yield is concerned.

Straining Latex

In a brief article in the same journal B. J. Eaton discusses the danger of using brass wire gauze for straining latex. Such strainers have been universally used on Far Eastern estates since the rubber plantation industry was started. But recently the possibility of contaminating raw rubber or latex with copper was brought to Mr. Eaton's attention. The danger is particularly great if the wire gauze becomes corroded and shows verdigris (green copper salts); while ammoniated latex should never be strained through brass wire sieves as the ammonia has a solvent action on the copper. Sieves of stainless steel, nickel, or monel metal are recommended, but they are all more expensive than the brass wire ones. Mr. Eaton states that even if the amount of copper in raw rubber is too small to cause tackiness at an early stage, it may have a deleterious effect on the aging of the finished article.

Netherland India

Since October 11 the special export duty on native rubber has been raised four times: on October 11 from 11 to 11½ guilder cents per half kilo; October 16, from 11½ to 12 cents; October 21, from 12 to 12½ cents; effective October 30, from 12½ to 13 cents per half kilo. That the Government has found it necessary not only to raise the already high duty to the above extent, but also to buy up export licenses covering 20,000 tons of rubber in order to keep within the quota proves at once its anxiety to adhere to its agreement and at the same time emphasizes the need for some other method of handling native rubber.

Of course the Government has never considered the duty as anything but a temporary measure, and for some time now Dutch officials assisted by native staffs have been registering the native gardens. This difficult work, progressing favorably, should be completed about the middle of 1936 so that it may be possible to introduce individual restriction for all native rubber growers by July 1. Incidentally, it appears that while most of the districts would welcome individual restriction, Djambi, Palembang, and Borneo, actually the chief rubber centers from which by far the greatest amount of native rubber is shipped, do not favor the plan.

The Government's purchase of licenses would still leave an excess of 14,000 tons of native rubber; so to remain within the quota native exports during the last quarter of 1935 will have to work out at about half their permissible quota. It is thought possible in some quarters that estates may not use their right to exceed the quota by 5%, in which case, of course, there would be hardly any excess even if the natives produced the whole of their allotted quotas.

The Deli Courant publishes a report indicating the efforts of the authorities toward improving native rubber, to some extent successful, are in certain sections of the country, at least, having unlooked-for and unwanted consequences. The Chinese remillers in Malaya, for whom the improved rubber may eventually spell ruin, are now striking out in self-defense. They have ordered their agents to offer the lowest possible prices for raw rubber, irrespective of quality; thus native growers, after going to the trouble of preparing the more expensive sheet, have actually found that they were selling at a loss. Then, too, the rough, unfinished slabs formerly prepared, and still largely produced, are ready for sale practically immediately; whereas the sheet must first dry for fourteen days, and the native prefers quick returns. Another disadvantage from the easy-going native's point of view is that the improved rubber must be more carefully handled, packed, and shipped once it is ready for sale. On the other hand, is a definite demand in America for the remilled blanket from the slabs, and as a result of the decreased supply of this type of rubber the market price has been going up until now hardly any difference exists between the rate for this blanket and for standard sheet. It would appear that no matter which angle of native rubber is handled, complications are bound to arise.

India

Reliable reports state the Dunlop Rubber Co. will establish a rubber factory near Calcutta to manufacture tires. It seems that representatives of the firm are now in India with a view to securing further tariff protection.

China

Canton papers report that the second three-year plan of the Kwangtung Government includes a scheme for planting rubber in Hainan, an island off the Gulf of Tongking, on the South Coast of China, since preliminary tests have been successful. It is also intended to improve the manufacture of rubber goods.

Ohio

(*Continued from page* 55)

thirty-two personally owned automobiles, bringing the total number of persons involved in the fleet's move to one hundred and twenty.

During its six months in Arizona this test car fleet will travel 1,200,000 miles of tire testing. One month's total mileage of a Goodyear test car equals a whole year's driving for Mr. Average Citizen, and in six months the total mileage per car will average between 90,000 and 110,000.

In charge of this test fleet on its trip West is M. D. Scott, manager of the company garage at Akron. Jack Greenleaf, veteran driver, directs the test units while in Arizona. G. P. Matthews, road supervisor, lays out the routes over which the thirty-eight drivers will travel in their day and night trips.

Practically every one of the test car driving personnel has at least eighteen years' automobile driving experience, accumulated in testing tires on roadways. Each man, driving between three and four hundred miles a day or night, must keep in excellent physical condition, get plenty of sleep, and pay strict attention to his driving. Cars are checked after every run to be sure that every detail is perfect, and, of course, the tires are inspected, and their mileage tallied for the records of the tire engineers and chemists.

Cities through which the Goodyear fleet travels are: Mansfield, Columbus, Springfield, and Dayton, O.; Richmond, Indianapolis, and Terre Haute, Ind.; Casey and Vandalia, Ill.; St. Louis, Columbia, Booneville, and Kansas City, Mo.; Topeka, Lyndon, and Independence, Kan.; Bartlesville, Tulsa, Oklahoma City, Wynnewood, and Ardmore, Okla.; Gainesville, Denton, Dallas, Fort Worth, Brady, Abilene, Sweetwater, Big Springs, Midland, Pecos, Van Horn, and El Paso, Tex.; Deming and Lordsburg, N. M.; and Tucson, Phoenix, and Litchfield Park, Ariz.

Wage-Hour Controversy

Secretary of Labor Frances Perkins recently appointed Major J. I. Miller, of Washington, D. C., Dr. Fred C. Croxton, of Columbus, O., and Hugh S. Hanna, of the Department of Labor, as a fact finding board in connection with the wage and hour controversy at the Goodyear plants in Akron.

Some departments at the Goodyear plant have been changed from the six- to the eight-hour shift, thus causing a controversy between the company on the one hand and the Goodyear Assembly and the United Rubber Workers of America on the other. The lack of satisfactory settlement constituted a "grievance" from the union point of view; consequently it requested the Department of Labor to appoint a board to investigate the hour and wage situation at the subject plant.

The above appointments were made after company officials had signified their willingness to cooperate with such a fact finding board.

Major Miller is an attorney, Dr. Croxton was formerly chief mediator, industrial commission administrator for Ohio during the World War, and Mr. Hanna is economic analyst and chief editor, bureau of labor statistics.

The B. F. Goodrich Co., Akron, recently rewarded ten employes in its field organization for suggestions on conduct of the company's business. W. J. Jarman was appointed district man-

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Patents and Trade Marks

MACHINERY

United States

2,015,445. **Sheet Rubber Shaper.** J. M. Bierer, Newton, and G. E. Apel, Belmont, assignors to Boston Woven Hose & Rubber Co., Cambridge, all in Mass.

2,015,459. **Tire Mold.** A. J. Musselman, Cuyahoga Falls, O.

2,015,530. **Rubber Goods Mold.** E. W. Madge, Birmingham, assignor to Dunlop Rubber Co., Ltd., London, both in England.

2,015,618. **Mixer.** R. T. Cooke, London, assignor to Francis Shaw & Co., Ltd., Manchester, both in England.

2,015,631 and 2,015,632. **Dipped Article Form.** A. N. Spánel, Rochester, N. Y.

2,015,635. **Tire Groover.** W. F. Errig, Philadelphia, and G. M. Pfundt, Churchville, assignors to Peco Mfg. Corp., Philadelphia, all in Pa.

2,015,647. **Molding Apparatus.** M. H. Martindell, assignor to Jos. Stokes Rubber Co., both of Trenton, N. J.

2,015,648. **Dipped Article Form.** J. R. Gammeter, Akron, O., assignor to International Latex Corp., Rochester, N. Y.

2,016,316. **Article Coater.** A. E. Collins, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,016,367. **Article Handler.** A. H. Feikert, assignor to American Anode, Inc., both of Akron, O.

2,016,450. **Elastic Body Printer.** H. A. Myers, Toledo, O.

2,016,590. **Rubber Roller Finisher.** E. J. Bussing, assignor to Chicago Daily News, Inc., both of Chicago, Ill.

2,016,865. **Bead Layer.** W. G. Lerch, assignor of ½ to Master Tire & Rubber Corp., both of Akron, O.

2,016,884. **Collapsible Tire Building Drum.** H. C. Bostwick, Coventry Township, assignor to Akron Standard Mold Co., Akron, both in O.

2,016,905. **Fluid Conduit Insulation Applier.** T. D. Nathan and A. B. Merrill, both of Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.

2,017,216. **Dolls' Head Mold.** S. Marcus, assignor, by mesne assignments, to Margon Corp., both of New York, N. Y.

2,017,423. **Mold Cleaner.** G. L. Walker, Jersey City, N. J., assignor to Air Reduction Co., Inc., New York, N. Y.

2,017,604. **Elastic Hosewear Mold.** S. E. Mountford and J. O. Frost, both of Philadelphia, Pa.

2,017,806. **Tube Stock Manipulator.** H. E. Riggs, Akron, and E. D. George, Cuyahoga Falls, both in O., assignors to Wingfoot Corp., Wilmington, Del.

Dominion of Canada

353,152. **Retreader.** P. E. Hawkinson, Minneapolis, Minn., U. S. A.

353,186. **Continuous Vulcanizer.** Boston Woven Hose & Rubber Co., Cambridge, assignee of T. M. Knowland, Watertown, both in Mass., U. S. A.

353,463. **Rubber Material Divider.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of H. Willshaw, H. Smith, and F. A. Davenport, co-inventors, all of Birmingham, England.

353,491. **Printing Plate Mold.** Viceroy Mfg. Co., Ltd., assignee of O. B. Crowell, both of Toronto, Ont.

353,509. **Tire Cut Filling Gun Cylinder.** R. M. and C. E. Bowes, co-inventors, both of Indianapolis, Ind., U. S. A.

United Kingdom

428,537. **Rubber Thread Knitter.** Mellor, Bromley & Co., Ltd., T. C. Bromley, and A. Shortland, all of Leicester.

428,585. **Footwear Mold.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

428,788. **Rubber Rolling Machine.** O. Elsworth, Newcastle-on-Tyne.

429,143. **Boot Vulcanizer.** Rollman & Mayer A. G., Nippes, Germany.

429,235. **Sheeting Apparatus.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of Soc. Italiana Pirelli, Milan, Italy.

429,353. **Elastic Thread Knitter.** R. F. Raven and H. A. Raynor, both of Nottingham.

430,091. **Cable Joint Insulator.** Electrical Research Products, Inc., New York, assignee of F. S. Malm, Millburn, both in N. Y., U. S. A.

430,268. **Elastic Fabric Knitter.** G. Blackburn & Sons, Ltd., Nottingham, and E. J. Towers, Nottinghamshire.

430,324. **Tire Mold.** K. Bader, London.

430,551. **Sheeting Rubberizer.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of Soc. Italiana Pirelli, Milan, Italy.

430,623. **Elastic Fabric Knitter.** E. Dubied & Cie Soc. Anon., Neuchâtel, Switzerland.

430,637. **Rubber Yarn Knitter.** R. Haddan, London. (Scott & Williams, Inc., New York, N. Y., U. S. A.)

430,744. **Elastic Thread Knitter.** R. F. Raven and H. A. Raynor, both of Nottingham.

430,911. **Vulcanizer.** A. Johnston and North British Rubber Co., Ltd., both of Edinburgh, Scotland.

Germany

618,656. **Process and Device for Making Seamless Dipped Goods.** Latex Holding Co., Akron, O., U. S. A. Represented by B. Kugelmann, Berlin.

618,704. **Process and Device for Making Dipped Goods.** J. R. Gammeter, Akron, O., U. S. A. Represented by J. Fritze, Hamburg.

618,706. **Vulcanizer.** Societa Italiana Pirelli and G. Cozzo, both of Milan, Italy. Represented by A. Bursch, Berlin.

619,266. **Thread Strip Cutter.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by C. and E. Wiegand, both of Berlin.

619,267. **Device and Process for Vulcanizing Belting, Sheets, Etc.** Den Norske Remfabrik A.S., Oslo, Norway. Represented by H. Joseph, Berlin.

619,312. **Cutter to Prepare Ends of Strips or Tubing for Joining.** Deutsche Dunlop Gummi Co., A.G., Hanau.

619,590. **Dipping Molds for Surgeons' Gloves.** Dunlop Rubber Co., Ltd., London, England, and Anode Rubber Co., Ltd., St. Peter's Port, Channel Islands. Represented by C. and E. Wiegand, both of Berlin.

619,941. **Apparatus for Spreading or Spraying Aqueous Dispersions.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by R. and M. M. Wirth and C. Weihe, all of Frankfurt a.M.

620,102. **Rubber Band Apparatus.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by C. and E. Wiegand, both of Berlin.

620,103. **Apparatus for Kneading Crude Rubber and Compounds.** Societa Italiana Pirelli, Milan, Italy. Represented by A. Bursch, Berlin.

620,785. **Regulator for Vulcanizers.** C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., U. S. A. Represented by H. and M. Licht, both of Berlin.

620,942. **Rubber Thread Apparatus.** L. Borner, Hersfeld.

PROCESS

United States

2,015,090. **Shoe Upper.** H. L. Sawyer, Lynn, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

2,015,207. **Vulcanizing Rubber.** S. L. Weller, Evanston, Ill., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.

2,015,394 and 2,015,395. **Spray Pipe.** W. F. Dray, E. Providence, R. I., assignor to Davol Rubber Co., a corporation of R. I.

2,015,440 and 2,015,441. **Artificial Leather Finishing.** M. O. Schur and B. G. Hoos, assignors to Brown Co., all of Berlin, N. H.

2,015,658. **Abrasive Article.** F. K. Bezzenberger, Cleveland Heights, assignor to Stratmore Co., Cleveland, both in O.

2,015,818. **Ribbed Warp Fabric.** P. Schönfeld, Chemnitz, Germany.

2,015,844. **Sock.** L. J. Byer, Newton, Mass.

2,016,092. **Surface Ornamentation.** R. H. Kavanaugh, Bangor, Me.

2,016,569. **Die.** P. R. Zinser, assignor to Woodall Industries, Inc., both of Detroit, Mich.

2,016,927. **Toy Vehicle Tire.** A. C. Korte, assignor to Metalcraft Corp., both of St. Louis, Mo.

2,017,071. **Bonding Rubber to Metal.** H. R. Minor, Oak Park, Ill., assignor, by mesne assignments, to Industrial Process Corp., Saratoga Springs, N. Y.

2,017,200. **Mounting Prints.** C. B. Beck, Brooklyn, assignor to Rudolf Lesch Fine Arts, Inc., New York, both in N. Y.

2,017,398. **Porous Rubber.** M. Faldini, assignor to Societa Italiana Pirelli, both of Milan, Italy.

2,017,444. **Elastic Fabric.** A. E. Page, Brooklyn, assignor to Scott & Williams, Inc., New York, both in N. Y.

Dominion of Canada

353,208. **Photographic Material.** Eastman Kodak Co., assignee of A. Murray, both of Rochester, N. Y., U. S. A.

353,366. **Coated Fabric.** Johnson & Johnson, Ltd., Montreal, P. Q., assignee of F. I. Bennett, Jr., Highland Park, N. J., U. S. A.

353,388. **Coating Paper.** Wingfoot Corp., Wilmington, Del., assignee of W. C. Calvert, Cuyahoga Falls, O., both in the U. S. A.

353,447. **Floor Covering.** Building Products, Ltd., Montreal, P. Q., assignee of Bird & Son, Inc., E. Walpole, assignee of P. R. Allen, Walpole, both in Mass., U. S. A.

353,518. **Rubber Glove.** F. E. Barns, Chicago, Ill., U. S. A.

353,558. **Artificial Leather Finishing.** Brown Co., assignee of M. O. Schur and B. G. Hoos, co-inventors, all of Berlin, N. H., U. S. A.

353,572. **Fibrous Sheet Material.** Dewey & Almy Chemical Co. of Canada, Ltd., Farnham, P. Q., assignee of Dewey & Almy Chemical Co., N. Cambridge, assignee of S. B. Neiley, Winchester, both in Mass., U. S. A.

353,605. **Belt.** La Société Des Procédés Ecla, assignee of L. S. M. Lejeune, both of Paris, France.

United Kingdom

428,576. **Attaching Rubber Soles and Heels.** B. E. J. Klijberg, Lichtenvoorde, Holland.

429,362. **Adhesive Treatment.** Dunlop Rubber Co., Ltd., London, and D. F. Twiss and F. A. Jones, Birmingham.

429,551. **Vulcanizing Tires.** Wingfoot Corp., Akron, O., U. S. A.

429,607. **Articles from Rubber Dispersions.** W. J. Tennant, London. (Vultex Corp. of America, Cambridge, Mass., U. S. A.)

429,641. **Dynamo-Electric Machine Insulation.** J. and F. Sigmund, (trading as Sigmund Pumpy Bratri Sigmundove), Lutin, Czechoslovakia.

429,656. **Dynamo-Electric Machine Insulation.** M. Sigmund, Lutin, Czechoslovakia.

429,705. **Attaching Rubber to Rigid Surfaces.** Dunlop Rubber Co., Ltd., London, and B. W. D. Lacey and W. V. Clarke, both of Birmingham.

429,877. **Axminster Rug Binding.** C. H. Davison, Princeton, N. J., U. S. A.

430,035. **Woven Belt.** J. H. Fenner & Co., Ltd., and J. H. Fenner, both of Hull.

430,107. **Rubber Thread.** U. Pestalozza and Soc. Italiana Pirelli, both of Milan, Italy.

430,360. **Ornamenting Gloves.** J. A. Clarke, Somerset.

Germany

618,658. **Vulcanizing Tire Parts.** Continental Gummiwerke A.G., Hannover.

619,147. **Perforated Rubber Sheets.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by R. and M. M. Wirth and C. Weihe, all of Frankfurt a.M.

619,311. **Footwear Uppers, Worked Flat and Patterned.** Hood Rubber Co., Inc., Wilmington, Del., U. S. A. Represented by G. Bertram and K. Lengner, both of Berlin.

619,329. **Making Footwear.** Helsingsborgs Gummifabriks A.B., Helsingborg, Sweden. Represented by E. Graf v. Reischach, Berlin-Halensee.

619,942. **Inflatable Body.** Radium Gummiwerke m.b.H., Koln-Dellbruck.

620,783. **Joining Rubber Shoe Parts in a Continuous Process.** United States Rubber Co., New York, N. Y., U. S. A. Represented by C. and E. Wiegand, both of Berlin.

CHEMICAL

United States

2,015,234. **Rubber Composition.** E. Rodman, Marshallton, assignor to E. I. du Pont de Nemours & Co., Wilmington, both in Del.

2,015,360. **Carbon Black.** R. H. Eagles, Hastings-on-the-Hudson, N. Y., assignor, by mesne assignments, to J. M. Huber Corp., Borger, Tex.

2,015,696. **Antioxidant.** W. L. Semon, Silver Lake Village, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,016,026 and 2,016,027. **Plastic, Elastic Material.** S. D. Shinkle, Passaic, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,016,102. **Rubber Conversion Product.** W. Breuers, Ludwigshafen a. Rhine, assignor to I. G. Farbenindustrie A. G., Frankfurt a. M., both in Germany.

2,016,286. **Rubber-Cellulose Mixture.** M. Levin, Buffalo, assignor of ¼ to J. T. Basseches, New York, N. Y.

2,016,335. **Latex Product.** J. McGavack, Leonia, N. J., assignor, by mesne assignments, to General Rubber Co., New York, N. Y.

2,016,403. **Rubber Treatment.** W. F. Tuley, Nutley, N. J., assignor to Morgan & Wright, Detroit, Mich.

2,016,736. **Rubber Surface Treatment.** J. W. Baymiller, Springfield, Mass., assignor to W. C. Geer, Ithaca, N. Y.

2,017,217. **Sponge Rubber.** H. R. Minor, Oak Park, Ill., assignor, by mesne assignments, to Industrial Process Corp., Saratoga Springs, N. Y.

2,017,593. **Colloidal Surface Treating Composition.** W. C. Geer, Ithaca, N. Y.

2,017,808. **Antiscorch.** H. R. Thies, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

Dominion of Canada

353,189. **Age Resister.** Canadian Industries, Ltd., Montreal, P. Q., assignee of I. Williams and A. M. Neal, both of Wilmington, Del., and W. A. Douglass, Penns Grove, N. J., co-inventors, all in the U. S. A.

353,190. **Accelerator.** Canadian Industries, Ltd., Montreal, P. Q., assignee of I. Williams and A. M. Neal, co-inventors, both of Wilmington, Del., U. S. A.

United Kingdom

428,052. **Rubber Composition.** Imperial Chemical Industries, Ltd., London, and M. Jones and W. F. Smith, both of Manchester.

428,100. **Bituminous Composition.** Rubber Producers Research Association, G. Martin, W. S. Davey, and T. A. Sharpley, all of London.

428,146. **Age Resister.** E. I. du Pont de Nemours & Co. and A. M. Neal, both of Wilmington, Del., U. S. A.

428,182. **Chlorinated Rubber Composition.** W. W. Triggs, London. (Naamlooze Vennootschap tot Voortzetting der Zaken van P. Schoen & Zoon, Zaandam, Holland.)

428,873. **Fireproofing Composition.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.

428,915. **Latex Concentration.** J. E. Nyrop, Copenhagen, Denmark.

429,024. **Rubber Composition.** J. S. B. Fleming, Ardrossan, R. M. Freer, Saltcoats, and Imperial Chemical Industries, Ltd., London.

429,039 and 429,040. **Leather Substitute.** Naturin Ges., assignee of Becker, Schultze & Co., both of Baden, Germany.

429,088. **Carbon Black Granules.** H. E. Potts, Liverpool. (United Carbon Co., Charleston, W. Va., U. S. A.)

429,277. **Latex Concentration.** Vultex Corp. of America, Cambridge, and H. B. Townsend, Belmont, both in Mass., U. S. A.

429,320. **Accelerator.** Goodyear Tire & Rubber Co., Akron, O., U. S. A.

429,557. **Rubber Solutions.** J. R. Geigy A. G., Basle, Switzerland.

429,559. **Latex Concentration.** Metallges. A. G., Frankfurt a. M., Germany.

429,728. **Plastic Composition.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

429,764. **Chlorinated Rubber Composition.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.

430,019. **Rubber Composition.** Siemens & Halske A. G., Berlin, Germany.

430,041. **Plastic Composition.** C. Deluzenne, Paris, France.

430,155 and 430,156. **Rubber Composition.** Ilfra Corp., Ltd., and F. N. Pickett, both of London.

430,335. **Age Resister.** Wingfoot Corp., Akron, O., U. S. A.

430,422. **Soft Rubber.** Rubber Producers Research Association, G. Martin, W. S. Davey, and H. C. Baker, all of London.

430,426. **Latex Purification.** Rubber Producers Research Association and H. P. Stevens, both of London.

430,618. **Age Resister.** A. H. Stevens, London. (B. F. Goodrich Co., New York, N. Y., U. S. A.)

430,773. **Rubber Composition.** Dunlop Rubber Co., Ltd., London, and D. F. Twiss and A. E. T. Neale, both of Birmingham.

Germany

618,657. **Glue and Rubber Mixings.** G. Goll and E. Helft, both of Berlin.

618,756. **Accelerating Vulcanization.** Th. Goldschmidt A.G., Essen, Ruhr.

618,924. **Vulcanizing Rubber Mixes.** Dunlop Rubber Co., Ltd., London, England. Represented by C. and E. Wiegand, both of Berlin.

618,925. **Vulcanizing Rubber.** Rubber Service Laboratories Co., Akron, O., U. S. A. Represented by F. During and H. Boeters, both of Berlin.

618,992 and 619,211. **Conversion Products of Rubber.** I. G. Farbenindustrie A.G., Frankfurt a.M.

619,408. **Masses Containing Rubber.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

Represented by C. and E. Wiegand, both of Berlin.

619,944. **Concentrated Rubber Solutions.** E. Meier, Halle a.S.-Nietleben.

620,751. **Softener.** Firma Louis Blumer, Zwickau, Sa.

GENERAL

United States

2,012,958. **Track for Tracklaying Vehicles.** J. M. Colby and L. A. Skinner, both of United States Army, Aberdeen, Md.

2,013,045. **Wringer.** E. V. Godfrey, Girard Township, assignor to Lovell Mfg. Co., Erie, both in Pa.

2,013,067. **Transfer Decoration Mounter.** T. S. Reese, Cleveland, O.

2,013,130. **Tire.** E. G. Budd, assignor to Edward G. Budd Mfg. Co., both of Philadelphia, Pa.

2,013,146. **Elastic Tape Mount.** H. F. Goldsmith, Elkins Park, Pa.

2,013,177. **Container Closure.** C. H. Egan, Belmont, assignor to Dewey & Almy Chemical Co., Cambridge, both in Mass.

2,013,190. **Corset.** C. H. Schopbach and W. G. Weber, assignors to International Corset Co., all of Aurora, Ill.

2,013,200. **Window Wiper.** G. M. Conway, Kansas City, Mo.

2,013,245. **Headwear.** C. E. Lewis, Truro, N. S., Canada.

2,013,323. **Airfoil Abrasion Shoe.** H. E. Waner, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,013,347. **Garment Belt.** H. R. Harris, Philadelphia, Pa., assignor to Permaflex, Inc., a corporation of Pa.

2,013,353. **Saddle.** A. J. Linder, assignor to Troxel Mfg. Co., both of Elyria, O.

2,013,358. **Knapsack Water Bag.** W. B. Osborne, Portland, Ore.

2,013,396. **Surgical Stocking.** P. Adamson, Rye, assignor to United States Rubber Co., New York, both in N. Y.

2,013,410. **Water Animal.** T. J. Howland, Long Branch, N. J.

2,013,436. **Garment.** M. M. Downing, Miami, Fla., assignor of ½ to E. C. Wall, Chicago, Ill.

2,013,495. **Parachute.** D. W. Kennedy, Matthews, Mo.

2,013,499. **Sealing Means.** J. W. Meckenstock, assignor to Pettibone Mulliken Co., both of Chicago, Ill.

2,013,550. **Cutting Machine Block.** G. B. Britton, Hannibal, assignor to International Shoe Co., St. Louis, both in Mo.

2,013,554. **Bathing Suit.** S. F. De Benedetto, Brooklyn, N. Y.

2,013,635. **Swimming Device.** O. Serafinowicz, Berlin, Germany.

2,013,693. **Yielding Wall Joint.** J. McInerny, New York, N. Y.

2,013,700. **Dress Shoe Cover.** R. C. Savale, W. Orange, N. J.

2,013,757. **Anklet.** G. H. Jung, Jr., assignor to Jung Arch Brace Co., both of Cincinnati, O.

2,013,771. **Model and Toy Building Construction.** E. E. Tompkins, Haverford, assignor to Rubber Specialties Co., Inc., Conshohocken, both in Pa.

2,013,794. **Football Guard.** J. P. Taylor, Brooklyn, N. Y.

2,013,849. **Athletic Field Sprinkler.** J. H. Keys, Dayton, O.

2,013,925. **Sheet Abrasive.** F. G. Okie, assignor to Minnesota Mining & Mfg. Co., both of St. Paul, Minn.

2,014,009. **Tympanic Pneumo Massager.** A. T. Vance, Los Angeles, Calif.

2,014,022. **Massager.** D. H. Klein, Memphis, Tenn.

2,014,043. **Printing Plate.** L. Harbison and S. C. Wilson, assignors to Econo Products, Inc., all of Rochester, N. Y.

2,014,129. **Inner Tube.** E. Eger, Grosse Pointe Park, Mich., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,014,149. **Adhesive Container Spreading Nozzle.** W. S. Stafford, assignor to S. S. Stafford, Inc., New York, N. Y.

2,014,152. **Bandage.** L. F. Taney, Chester Heights, Pa.

2,014,153. **Steam Radiator Valve Cap.** G. W. Taylor, E. Milton, Mass.

2,014,218. **Four-Cylinder Offset Rotary Machine.** F. Wolff, Plauen, assignor to Vomag-Betriebs-A.-G., Plauen i. V., both in Germany.

2,014,236. **Juice Extractor and Feeder.** L. B. McNamara, Norfolk, Va.

2,014,245. **Ice Preserver.** J. A. Donahoe, assignor to Donahoe's Inc., both of Pittsburgh, Pa.

2,014,255. **Tire Tread.** F. G. W. King, Sutton Coldfield, England, assignor to Dunlop Tire & Rubber Corp., Buffalo, N. Y.

2,014,264. **Storage Tank Seal.** J. C. Patrick, Kansas City, Mo.

2,014,268. **Coaster.** V. Tenney, Honolulu, T. H.

2,014,293. **Flexible Bath Brush.** W. A. Riley, New York, N. Y.

2,014,360. **Resilient Wheel.** H. M. Patch, Seattle, Wash., assignor, by mesne assignments, to Wingfoot Corp., Wilmington, Del.

2,014,364. **Fly Swatter.** C. T. Achor, Warsaw, Ind.

2,014,390. **Battery.** E. G. Lunn, Washington, D. C.

2,014,423. **Electrical Plug Device.** L. P. Clark, Jr., Fairfield, Conn.

2,014,426. **Inflatable Fiber-Coated Article.** I. Dorogi, assignor, by direct and mesne assignments, to Hungarian Rubber Goods Factory, Ltd., both of Budapest, Hungary.

2,014,438. **Brake Lining Material.** A. E. Leach, Royal Oak, assignor to General Motors Corp., Detroit, both in Mich.

2,014,441. **Insulator.** G. A. Matthews, Detroit, Mich.

2,014,446, 2,014,448, and 2,014,449. **Pneumatic Dispatch Tube System Carrier.** J. T. Needham, N. Plainfield, N. J.

2,014,453. **Sheet Material Folder.** T. C. Rowen, Swampscott, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

2,014,459. **Auxiliary Vehicle Wheel.** C. S. Woodruff, Van Wert, O.

2,014,460. **Composite Sheet Material.** A. V. Alm, Marblehead, assignor to Dennison Mfg. Co., Framingham, both in Mass.

2,014,466. **Machinery Base.** C. C. Cheyney, assignor to Buffalo Forge Co., both of Buffalo, N. Y.

2,014,467. **Cushioning Support.** C. C. Cheyney, assignor to Buffalo Forge Co., both of Buffalo, N. Y.

2,014,545. **Figure Molding Garment.** H. Wipperman, assignor to H. W. Gossard Co., both of Chicago, Ill.

2,014,571. **Pneumatic Dispatch Carrier.** C. S. Jennings, assignor to Lamson Co., both of Syracuse, N. Y.

2,014,600. **Float Valve.** H. N. Wayne, Santa Monica, Calif.

2,014,607. **Electrical Safety Plug.** A. Angeli, Papiermuhle, Switzerland.

2,014,618. **Tire Pressure Regulator and Equalizer.** R. R. Haines, Dallas, Tex.

2,014,628. **Shoe.** G. E. Musebeck, assignor to Musebeck Shoe Co., both of Danville, Ill.

2,014,671. **Sprayer.** F. Rothe, Dresden, Germany.

2,014,731. **Cushion Wheel.** C. O. Guernsey, Yeadon, Pa.

2,014,777. **Retractable Landing Gear.** S. T. Payne, Kenmore, and F. R. Weymouth, Buffalo, both in N. Y., assignors to Curtis Aeroplane & Motor Co., Inc., a corporation of N. Y.

2,014,788. **Lawn Billiard Game.** C. K. Strickler and J. C. Randall, both of Columbus, O.

2,014,793. **Retractable Landing Gear.** F. R. Weymouth and F. A. Wedberg, both of Buffalo, N. Y., assignors to Curtis Aeroplane & Motor Co., Inc., a corporation of N. Y.

2,014,811. **Vehicle Wheel.** J. Mayer, Detroit, Mich.

2,014,837. **Refrigerating Unit.** F. W. Daemicke, Chicago, Ill.

2,014,842. **Milking Machine.** R. L. Hinman, assignor to Hinman Milking Machine Co., Inc., both of Oneida, N. Y.

2,014,881. **Tube Self-Closing Valve.** K. S. Carlstrom, Watertown, Mass.

2,015,009. **Animated Toy.** O. Erickson, assignor of ¼ to R. W. Good and ¼ to C. N. Sunner, all of Eagle Grove, Iowa.

2,015,057. **Transmission.** A. L. Boisvert, Keene, N. H.

2,015,070. **Valve Stem.** H. M. Flint, assignor to Gates Rubber Co., both of Denver, Colo.

2,015,123. **Blood Transfusion Apparatus.** S. Pennell, New York, N. Y.

2,015,165. **Golf Ball.** D. F. Twiss, Wylde Green, F. A. Jones, Birmingham, and E. W. Allen, Knowle, assignors to Dunlop Rubber Co., Ltd., Birmingham, all in England.

2,015,255. **Post-Operative Binder and Supporting Belt.** L. L. Charpier and E. D. Huntington, both of Chicago, Ill.

2,015,337. **Trousers.** H. C. D'Annunzio, assignor to Fashion Park Mfg. Corp., both of Rochester, N. Y.

2,015,352. **Hub Cap.** J. S. Reid, Shaker Heights, assignor to Reid Products Co., Cleveland, both in O.

2,015,365. **Clothes Wringer.** W. F. Peters and D. L. Todd, both of Dayton, O.

2,015,379. **Dry Cell and Seal Therefor.** C. P. Deibel, Lakewood, O.

2,015,403 and 2,015,404. **Electric Cord Antitwister.** A. W. Kiddle, New York, N. Y.; A. M. F. Kiddle and G. H. Halbert, executors of said A. W. Kiddle, deceased.

2,015,418. **Electric Plug Connector.** H. H. Wermine, assignor to Belden Mfg. Co., both of Chicago, Ill.

2,015,427. **Tractor Lug.** H. Griebat, Lodi, Calif.

2,015,475. **Goggles.** M. Helfenstein, assignor to Schweizerische Unfallversicherungsanstalt, both of Lucerne, Switzerland.

2,015,477. **Spark Plug Shield.** R. T. Hurley, Dobbs Ferry, N. Y., assignor, by mesne assignments, to Bendix Aviation Corp., S. Bend, Ind.

2,015,497. **Corn Pad.** W. M. Scholl, Chicago, Ill.

2,015,508. **Game.** R. E. Ashley, Waban, Mass.

2,015,565. **Bottle Top Opener.** E. O. Loeber, assignor, by direct and mesne assignments, of ½ to Rulo Co. and ½ to R. H. Jamison, all of Cleveland, O.

Dominion of Canada

352,541. **Finishing Welt.** R. W. Springer, co-inventor with and assignee of G. T. Buchanan, both of Detroit, Mich., U. S. A.

352,543. **Tire.** J. G. Smith, assignee of A. H. Shoemaker, both of Seattle, Wash., U. S. A.

352,570. **Fishing Line Trolling Unit.** A. Kolstrand, Seattle, Wash., U. S. A.

352,574. **Gear Mechanism.** R. J. L. Moineau, Paris, France.

352,690. **Windshield Wiper.** Three-Way Windshield Wiper Co., assignee of G. Y. Lauchin, both of Milwaukee, Wis., U. S. A.

352,705. **Printing Roller.** Dayton Rubber Mfg. Co., assignee of A. L. Freedlander, both of Dayton, O., U. S. A.

352,737. **Front Wheel Shock Absorber.** J. W. Leighton, Port Huron, Mich., U. S. A.

352,761. **Auto Topping.** Canadian Industries, Ltd., Montreal, P. Q., assignee of R. Morgan, Bridgeport, Conn., U. S. A.

352,807. **Tuner.** Radio Corp. of America, New York, N. Y., assignee of Victor Talking Machine Co., Camden, N. J., assignee of A. Weiland, Philadelphia, Pa., all in the U. S. A.

352,854. **Drinking Vessel Washer.** C. Chambers, Birmingham, England.

352,873. **Elastic Belt.** A. Langis, Montreal, P. Q.

352,881. **Pneumatic Bumper Cover.** G. F. Stamand, Stoneham, Mass., U. S. A.

352,892. **Electrical Outlet.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. B. Benander, Yalesville, Conn., U. S. A.

352,975. **Plastic-Elastic Binding Material.** J. Rinse and W. Dorst, co-inventors, both of Overveen, Netherlands.

352,987. **Chassis Apparatus.** A. Dubonnet, Neuilly-sur-Seine, France.

352,988. **Vehicle Suspension.** A. Dubonnet, Neuilly-sur-Seine, France.

352,991. **Hose Supporter.** W. E. Hatheway, Bridgeport, Conn., U. S. A.

353,025. **Bandage.** A. B. A. Specialties Co., Inc., assignee of A. Fridolph, both of New York, N. Y., U. S. A.

353,042. **Electric Switch.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of R. N. Rowe, Plainville, Conn., U. S. A.

353,076. **Pipe Joint Gasket.** S. R. Dresser Mfg. Co., assignee of G. H. Pfefferle, both of Bradford, Pa., U. S. A.

353,080. **Swing Seat.** Everwear Mfg. Co., assignee of W. B. Evans, F. C. Garratt, and E. F. Hoppes, co-inventors, all of Springfield, O., U. S. A.

353,086. **Antiskid Device.** Gillette Rubber Co., assignee of H. B. Gillette, deceased, both of Eau Claire, Wis., U. S. A.

353,099. **Tire Valve Cap.** Lyon Cover Co., assignee of H. S. Jandus, both of Detroit, Mich., U. S. A.

353,101. **Tire.** Macmillan Tyre Trust, Ltd., assignee of J. Macmillan, both of London, England.

353,139. **Resilient Centering Device.** F. H. Beamer, Buffalo, N. Y., U. S. A.

353,210. **Electric Accumulator Hydrometer.** Electric Storage Battery Co., Philadelphia, Pa., U. S. A., assignee of A. W. Browne, Clifton Junction, England.

353,231. **Foundation Garment.** I. Newman & Sons, Inc., New Haven, Conn., assignee of K. E. Cunningham, New York, N. Y., both in the U. S. A.

United Kingdom

427,322. **Cable.** Siemens & Halske A. G., Berlin, Germany.

427,383. **Windscreen Cleaner.** Vauxhall Motors, Ltd., Luton, and W. W. Constantine, Westminster.

427,393. **Screw Propeller.** C. A. Fountaine, Norfolk.

427,573. **Swimming Appliance.** M. Lewin, London.

427,658. **Post.** A. M. Orr, Bearsden, Scotland.

427,717. **Golf Club.** W. Heyes, Manchester.

427,737. **Sign.** C. W. Hardman, Liverpool.

427,787. **Hair Waver.** C. M. L. Grundy, Sudbury.

427,791. **Paint Brush.** S. Beck, Nuremberg, Germany.

427,891. **Engine Mounting.** Tatra-Werke Automobil-Und Waggonbau A. G., Prague, Czechoslovakia.

427,939. **Hand-propelled Bicycle.** J. A. Knetemann, Oegstgeest, Holland.

428,014. **Well Packer.** D. L. T. O'Connor, Maracaibo, Venezuela.

428,036. **Wire Resistance.** E. Flickschu, Berlin, Germany.

428,053. **Toy Airplane.** H. Auge, Nuremberg, Germany.

428,068. **Hair Net.** R. Shaw, Nottingham.

428,079. **Cable End Sleeve.** British Thomson-Houston Co., Ltd., London, assignee of Allgemeine Elektricitäts-Ges., Berlin, Germany.

428,162. **Eraser.** J. W. Hamilton-Jones, London.

428,173. **Vehicle Spring Suspension.** Ing. h.c. F. Porsche Ges., Stuttgart, Germany.

428,345. **Pneumatic Sucker Fastening.** A. Rovenstrunk, Lüdenscheid, Germany.

428,412. **Concrete Pipe Molder.** E. G. Gollo, Turin, Italy.

428,437. **Coupling.** C. B. Strandgren, Versailles, France.

428,478. **Thermionic Valve.** E. Y. Robinson, Enfield, and Associated Electrical Industries, Ltd., London.

428,567. **Annular Track Wheel.** T. H. Rushton, Grimsby.

428,575. **Air Mattress.** W. H. Houghton, Orpington.

428,582. **Racket.** D. Reid, Kew.

428,600. **Brush.** Hamilton & Co. (London), Ltd., London, and F. J. Monk, Harrow.

428,604. **Engine Mounting.** Firestone Tyre & Rubber Co., Ltd., Brentford, assignee of C. Sauer, Akron, O.

428,643. **Material Cutter, Creaser, and Folder.** G. C. and F. G. Rapkin and F. A. Squire, all of London.

428,664. **Vehicle Spring Suspension.** S. B. Weston, Burntwood.

428,670. **Joint Strip.** O. J. Crowe, Detroit, Mich., U. S. A.

428,682. **Golf Practicing Appliance.** F. S. Brereton, Hemel Hempstead.

428,693. **Music Practicer.** G. Woodhouse, London.

428,704. **Barrel.** F. J. T. Barnes, Newstead, Brisbane, Australia.

428,726. **Inductance.** Siemens & Halske A.G., Berlin, Germany.

428,727. **Fountain Pen.** Macniven & Cameron, Ltd., and W. Jeffrey, both of Edinburgh, Scotland.

428,737. **Wheel.** E. Rimailho, Paris, France.

428,745. **Hose Coupling.** Boston Woven Hose & Rubber Co., Cambridge, Mass., U. S. A., assignee of T. M. Knowland.

Germany

618,624. **Heel.** M. Voit, Winterthur, Switzerland. Represented by F. and A. Weickmann.

619,380. **Ball.** Wetzell Gummiwerke A.G., Hildesheim.

619,625. **Atomizer.** E. Spardel, Ohlstedt, Hamburg.

619,641. **Tip for Syringes.** A. Bengston, Dresden.

619,658. **Block Belt.** H. Umbach, Essen, Ruhr.

619,932. **Dustcloth.** W. Kuster, Wuppertal-Wichlinghausen.

620,034 and 620,035. **Block Belt.** H. Scherrer, Bern, Switzerland. Represented by B. Oettinger, Berlin.

620,482. **Heel.** T. Liertz, Hannover.

621,497. **Tire Anti-skid Device.** G. Keilmansegg, Maria-Enzersdorf, Austria. Represented by C. Deichler, Berlin.

621,500. **Sole Patch.** T. Liertz, Hannover.

621,561. **Door Buffer.** H. Hartemink and P. L. Prins, both of Amsterdam, and Naamlooze Vennootschap Plaatmetaalindustrie van Mouwerik & Bal, Zeist, all in Holland. Represented by E. and W. Meissner and H. Tischer, all of Berlin.

TRADE MARKS

United States

327,695. Representation of a small boy about to retire, holding a tire in his right hand and a lighted candle in his left, and above the representation the word: **"Fisk."** Heels. Fisk Rubber Corp., Chicopee Falls, Mass.

327,729. **Health-Lastic.** Garters, suspenders, brassieres, girdles, and hose supporters. Gem-Dandy Garter Co., Madison, N. C.

327,757. **Laytexile.** Anti-skid compound backed rugs and carpets. E. O. Whiteley, doing business as Laytexile Co., San Francisco, Calif.

327,913. Label containing representation of an arrow through the letter: **"W."** Rubber and fabric tubing. A. J. Weatherhead, Jr., doing business as Weatherhead Co., assignor to Weatherhead Co., both of Cleveland, O.

327,914. The letter: **"B"** on either side of a diamond. Brass bicycle tire repair plugs. Wald Mfg. Co., Inc., Maysville, Ky.

327,936. **Sceptre.** Engine and machinery packings. Beldam Packing & Rubber Co., Ltd., London, England.

327,937. **Bison.** Engine and machinery packings. Beldam Packing & Rubber Co., Ltd., London, England.

328,106. **Vulnoplast.** Nonmedicated adhesive plasters. Vulnoplast Lakemeier A.-G., Bonn a. Rhine, Germany.

328,113. **Airpath.** Rubber composition floor and table coverings. Republic Rubber Co., Youngstown, O.

328,132. **Pneu-Pak.** Rubber composition padding and packings for refrigerator car doors and hatches. Republic Rubber Co., Youngstown, O.

328,178. **Anode.** Rayon products. B. F. Goodrich Co., doing business as Miller Rubber Products Co., Akron, O.

328,183. Representation of a shield containing the words: **"Rusco Engineered."** Brake lining sets. Russell Mfg. Co., Middletown, Conn.

328,199. **Horco.** Rubberized fabrics. Hodgman Rubber Co., Inc., Framingham, Mass.

Market Reviews

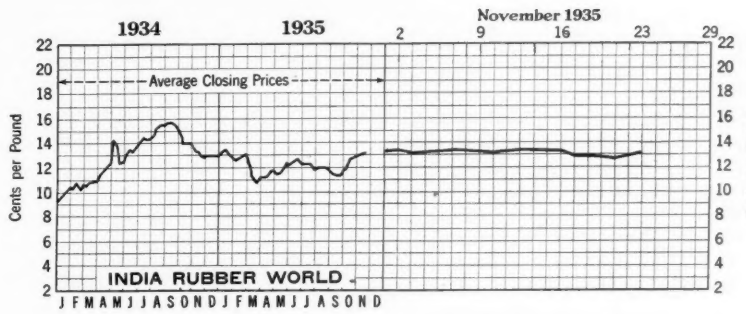
CRUDE RUBBER

New York Quotations

New York outside market rubber quotations in cents per pound

Plantations	Nov. 26, 1934	Oct. 26, 1935	Nov. 25, 1935
Rubber latex, normal .....gal.	54	54 /55	50
Sheet			
Ribbed, smoked, spot	12 5/8/12 3/4	13 1/16/13 1/8	13
Nov.-Dec.	12 5/8/12 3/4	13 1/8/13 1/4	13 /13 1/16
Jan.-Mar.	12 7/8/13	13 3/8/13 7/16	13 7/16/13 1/4
Apr.-June	13 1/4/13 3/8	13 1/2/13 11/16	13 3/8/13 7/16
Crepe			
No. 1 thin latex, spot	13 3/8/13 1/2	13 7/16/13 1/2	13 7/16/13 3/8
Nov.-Dec.	13 3/8/13 1/2	13 3/8/13 5/8	13 3/8
Jan.-Mar.	13 5/8/14 1/4	13 5/8/13 11/16	13 7/16/13 5/8
Apr.-June	14 /15	13 3/4/14 1/16	13 11/16/13 7/8
No. 3 Amber, spot	10 3/4/11	12 5/8/12 3/4	12 3/4
No. 1 Brown	11 /11 1/8	12 3/4/12 11/16	12 11/16/12 7/8
Brown rolled	9 3/8/ 9 5/8	11 3/4/12	12 1/4/12 1/8
Paras			
Upriver fine	9 1/2	11 7/8	13 1/4
Upriver fine	*12 3/4	*13 1/4	*15 3/4
Upriver coarse...	7	8	9
Upriver coarse...	*11	*12 1/4	*12 1/2
Islands fine	9 1/4	12 1/4	13 3/4
Islands fine	*12 3/4	*13 1/4	*15 3/4
Acre, Bolivian fine	9 3/4	12	13 1/2
Acre, Bolivian fine	*13	*13 1/2	*16
Beni, Bolivian ...	9 3/4	11 7/8	13 3/4
Madeira fine	9 1/2	12 1/4	13 1/4
Caucho			
Upper ball	7	8	9
Upper ball	*11	*12 1/4	*12 1/2
Lower ball	6 3/4	7 3/4	8 1/2
Pontianak			
Bandjermasin	6	7	6 1/2
Pressed block ...	10 1/4	12 1/2	13 1/2
Sarawak	6	7	6 1/2
Guayule			
Duro, washed and dried	12	12	12
Ampar	13	13	13
Africans			
Rio Nuñez	12	14	15
Black Kassai	10	13	15
Prime Niger flake.	25	25	25
Gutta Percha			
Gutta Siak	9	12 1/2	12 1/4
Gutta Soh	14	12 1/2	13
Red Macassar ...	1.50	1.10	1.25
Balata			
Block, Ciudad Bolivar	40	32	30
Manaos block	30	29	28
Surinam sheets ..	40	33	33
Amber	42	37	36

*Washed and dried crepe. Shipments from Brazil.



New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	Sept. 28	Nov. 2	Nov. 9	Nov. 16	Nov. 23
Oct.	11.81	.....	.....	.....	.....
Nov.	.....	13.17	13.22	13.09	13.00
Dec.	11.97	13.21	13.30	13.16	13.05
Mar.	12.22	13.46	13.53	13.39	13.35
June	12.40	13.70	13.76	13.62	13.61
Sept.	.....	13.90	13.95	13.86	13.74
Oct.	.....	13.96	14.01	13.93	13.81
Volume per week (tons) ..	8,590	15,060	6,410	13,070	22,990

THE above table gives the nearest first and last week-end closing prices of the month previous to that just closed, also the week-end closing prices of each week of last month up to time of going to press. This plan sets forth the general price trends in the briefest possible manner.

The constantly rising trend of rubber future prices throughout October brought them from below the 12¢ level to substantially above 13¢, and distant futures over 14¢ per pound. From the beginning of November a tendency toward lower prices began, although the fluctuations were confined to regions above 13¢ except dips of near futures on and after November 21.

This wavering and sagging tendency in November could hardly be attributed to the statistical position of rubber as the reported Malayan exports dropped to 48,258 tons in October from 51,247 in September. Some apprehension seemed to exist as to what quota action the I.R.R.C. might take in the meeting called for November 26, but rescheduled for December 3. The D.E.I. natives have made rather strenuous demands for an increased quota. Most important, perhaps, have been the tire price war and the price reductions to automobile manufacturers. While recently in the period rumors have circulated that the price structure was being stabilized, traders are too skeptical of the apparent volume avariciousness of tire manufacturers to gain confidence very rapidly. Late Malayan production statistics were not so encouraging. While estate production decreased 1,421 tons in October compared to September native production increased 8,656 tons, making the totals 34,588 for October as against 27,353 for September.

New York Outside Market

No. 1 smoked sheets came through October with a price trend continuously pointing in an upward direction. With the turn of November, however, slight declines and fluctuations set in as was also true with the futures market. With it all there was a firmness to the market and a moderate demand

New York Outside Market—Spot Closing Rubber Prices—Cents per Pound

	October, 1935				November, 1935																		
	28	29	30	31	1	2	4	5*	6	7	8	9	11*	12	13	14	15	16	18	19	20	21	22	23
No. 1 Ribbed Smoked Sheet	13 1/4	13 1/4	13 1/2	13 7/16	13 1/4	13 1/4	13 1/16	..	13 1/4	13 3/8	13 7/16	13 1/4	..	13 1/16	13 7/16	13 3/8	13 7/16	13 1/16	13	13	12 11/16	13	13 1/16	13 1/16
No. 2 Ribbed Smoked Sheet	12 11/16	12 11/16	13 1/16	13	12 11/16	12 11/16	12 11/16	..	12 11/16	13 1/16	13	12 11/16	..	12 13/16	12 7/8	13 1/16	12 11/16	12 7/8	12 3/4	12 3/4	12 11/16	12 3/4	12 11/16	12 11/16
No. 3 Ribbed Smoked Sheet	12 11/16	12 11/16	13 1/16	12 7/8	12 11/16	12 11/16	12 11/16	..	12 11/16	12 11/16	12 7/8	12 11/16	..	12 11/16	12 3/4	13	12 11/16	12 3/4	12 5/8	12 5/8	12 7/8	12 5/8	12 11/16	12 11/16
No. 4 Ribbed Smoked Sheet	12 3/4	12 3/4	13	12 11/16	12 3/4	12 5/8	12 5/8	..	12 3/4	12 7/8	12 11/16	12 3/4	..	12 5/8	12 11/16	12 13/16	12 3/4	12 11/16	12 7/8	12 7/8	12 5/8	12 7/8	12 5/8	12 5/8
No. 1 Thin Latex Crepe	13 1/2	13 1/2	13 3/4	13 9/16	13 1/2	13 3/4	13 3/8	..	13 1/2	13 5/8	13 1/2	13 1/2	..	13 3/8	13 7/16	13 11/16	13 5/8	13 1/2	13 3/8	13 3/8	13 7/16	13 3/8	13 7/16	13 7/16
No. 1 Thick Latex Crepe	13 3/8	13 3/8	13 5/8	13 7/16	13 3/8	13 1/4	13 1/4	..	13 3/8	13 1/2	13 3/8	13 3/8	..	13 1/4	13 7/16	13 1/2	13 7/16	13 7/16	13 7/16	13 7/16	13 1/16	13 7/16	13 1/4	13 1/4
No. 1 Brown Crepe	12 7/8	12 7/8	13 1/8	13	12 11/16	12 11/16	12 11/16	..	12 11/16	13	13	13	..	12 7/8	12 11/16	13 1/16	12 11/16	12 11/16	12 11/16	12 11/16	12 3/4	12 11/16	12 7/8	12 7/8
No. 2 Brown Crepe	12 3/4	12 3/4	13	12 7/8	12 11/16	12 11/16	12 11/16	..	12 11/16	12 7/8	12 7/8	12 7/8	..	12 3/4	12 11/16	12 13/16	12 11/16	12 11/16	12 11/16	12 11/16	12 5/8	12 11/16	12 3/4	12 3/4
No. 2 Amber	12 7/8	12 7/8	13 1/8	13	12 11/16	12 11/16	12 11/16	..	12 11/16	13	13	13	..	12 7/8	12 11/16	13 1/16	12 11/16	12 11/16	12 11/16	12 11/16	12 3/4	12 11/16	12 7/8	12 7/8
No. 3 Amber	12 3/4	12 3/4	13	12 7/8	12 11/16	12 11/16	12 11/16	..	12 11/16	12 7/8	12 7/8	12 7/8	..	12 3/4	12 11/16	12 13/16	12 11/16	12 11/16	12 11/16	12 11/16	12 5/8	12 11/16	12 3/4	12 3/4
No. 4 Amber	12 5/8	12 5/8	12 7/8	12 3/4	12 11/16	12 7/8	12 7/8	..	12 5/8	12 11/16	12 11/16	12 11/16	..	12 7/8	12 5/8	12 3/4	12 5/8	12 5/8	12 1/2	12 1/2	12 7/16	12 1/2	12 7/8	12 7/8
Rolled Brown	12 1/8	12 1/8	12 3/8	12 1/4	12 1/4	12 1/8	12 1/8	..	12 1/4	12 7/16	12 5/8	12 5/8	..	12 1/2	12 7/8	12 3/4	12 7/8	12 7/8	12 7/8	12 7/8	12 3/4	12 7/8	12 1/2	12 1/2

*Holiday.

which would become very evident with each decline. The week-end closing prices for the two months past follow: September 28, 11 11/16¢; October 5, 12 3/16¢; October 12, 12 1/16¢; October 19, 13¢; October 26, 13 3/16¢; November 2, 13 1/8¢; November 9, 13 1/4¢; November 16, 13 1/16¢; and November 23, 13 3/16¢.

The R.M.A. estimated the September production of tires to be 3,786,873, 5.2% below that of August, but 29% over September, 1934.

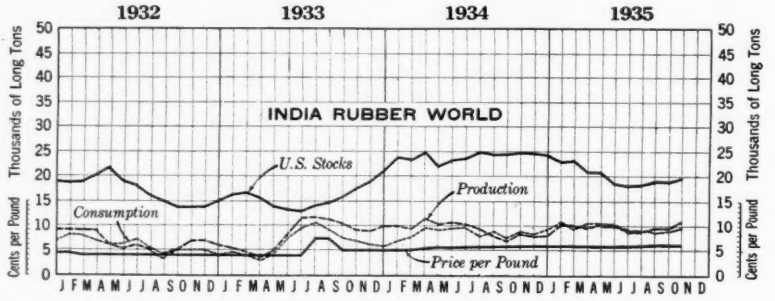
Crude rubber consumption in the United States for October was reported to be 42,436 tons as against 37,553 for September and 31,253 for October, 1934. 411,428 tons were consumed the first ten months this year, which compares with 383,317 last year and 418,614 in 1929, the only like period exceeding this year's absorption.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	Inquiry
1933	Manufacturer of rubber deodorants.
1934	Manufacturer of finish lacquer for latex forms.
1935	Manufacturer of debeading machine.
1936	Manufacturer of rubber washing plant equipment.
1937	Manufacturer of the filler R M 347.
1938	Seller of Koroseal.
1939	Manufacturer of rubber cements.
1940	Manufacturer of testing equipment for a rubber research laboratory.
1941	Manufacturer of mills, calenders, and curing equipment for a rubber research laboratory.
1942	Manufacturer of ready mixed clay used in making rubber stamp matrices.
1943	Supplier of liquid rubber that can be molded into non-hardening ornaments.
1944	Information wanted on manufacturing rubber cements.
1945	Manufacturer of running board mats.
1946	Supplier of normal rubber latex.
1947	Supplier of rubber manufacturing equipment, both new and second-hand.
1948	Manufacturer of gutta percha materials.
1949	Manufacturer of latex gloves and clothing.
1950	Manufacturer of force cups.
1951	Manufacturer of ribbed water hose.
1952	Information wanted on uniting rubber to metal.
1953	Manufacturer of mats from auto tires.
1954	Manufacturer of squeegee rubbers.
1955	Manufacturer of rubber punching machines.
1956	Manufacturer of Charnack looms.
1957	Manufacturer of sanitary specialties.
1958	Manufacturer of extra-thick rubber sheeting.
1959	Manufacturer of doubling machines.
1960	Manufacturer of elastic webbing.
1961	Manufacturer of suction-type sink stoppers over six inches in diameter.
1962	Manufacturer of a binder for powdered mica.
1963	Manufacturer of mica tubing with a hole ¼-inch in diameter.
1964	Manufacturer of very thin sheet mica for electrical ignition.
1965	Supplier of magnesia carbonated.
1966	Manufacturer of rubber garments for sand blasters.
1967	Manufacturer of a laboratory stirrer.
1968	Manufacturer of a sponge rubber cutter.
1969	Manufacturer of window stripping.
1970	Manufacturer of hose machinery.
1971	Manufacturer of molded fiber stock with imitation leather surface.
1972	Manufacturer of chlorinated rubber.
1973	Manufacturer of phenyl hydrazine.
1974	Manufacturer of extruders.
1975	Manufacturer of rubber garments.
1976	Manufacturer of Pennex.
1977	Manufacturer of Varsol.
1978	Manufacturer of sponge rubber mitts.
1979	Manufacturer of Hammel bed lasting machines.

RECLAIMED RUBBER



Production, Consumption, Stocks, and Price of Tire Reclaim

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption % to Crude	U. S. Stocks*	Exports
1933	99,974	81,612	20.1	20,746	3,583
1934	110,010	100,597	22.3	23,079	4,737
1935					
January	10,465	11,261	23.9	22,291	517
February	10,072	9,374	21.7	22,989	532
March	9,741	10,549	24.8	20,637	310
April	10,315	10,466	23.4	20,521	476
May	10,223	9,938	23.9	18,541	402
June	8,590	8,710	23.8	17,932	283
July	8,421	8,396	23.1	17,810	384
August	9,557	8,795	22.4	18,272	320
September	9,041	8,774	23.4	18,260	442
October	11,926	9,662	22.8	19,640	...

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

OWING to the increasing activity in rubber goods manufacturing lines in general the demand for reclaims has advanced in marked degree. This is shown by the statistics of consumption of reclaim for October, which shows an increase for that month of 888 tons over the corresponding figures for September. This increase is credited to the revival of output of rubber products for automotive use, insulated wire for the building industry, as well as the more seasonal and miscellaneous rubber lines.

Reclaimers advanced their output for October to 11,926 long tons, an increase of 2,885 tons over the September output. Many manufacturers of rubber products are now contracting for supplies of reclaim at current prices to cover their estimated needs for the early months of 1936.

Prices on all standard grades are quoted unchanged from one month ago.

New York Quotations

November 25, 1935

	Spec. Grav.	Cents per lb.
High Tensile		
Super-reclaim, black	1.20	8¼/9
red	1.20	7 /7¼
Auto Tire		
Black	1.21	5 /5¼
Black selected tires	1.18	5¼/5½
Dark gray	1.35	6¼/6½
White	1.40	9¼/9½
Shoe		
Unwashed	1.60	6½/6¾
Washed	1.50	8 /9
Tube		
No. 1	1.00	13 /
No. 2	1.10	7½/7¾
Truck Tire		
Truck tire, heavy gravity	1.55	5½/6
Truck tire, light gravity	1.40	6 /6¼
Miscellaneous		
Mechanical blends	1.60	4¼/4½

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for October, 1935:

Rubber Exports: Ocean shipments from Singapore, Penang, Malacca, and Port Swettenham

	October, 1935	
To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	8,390	346
United States	23,864	548
Continent of Europe	9,772	193
British possessions	1,441	14
Japan	3,032	35
Other countries	619	4
Totals	47,118	1,140

Rubber Imports: Actual, by Land and Sea

	October, 1935	
From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	5,702	3,115
Dutch Borneo	3,806	761
Java and other Dutch islands	188	...
Sarawak	1,993	175
British Borneo	491	15
Burma	155	8
Siam	1,812	810
French Indo-China	133	83
Other countries	96	21
Totals	14,376	4,988

COMPOUNDING INGREDIENTS

RUBBER compounding ingredients in general are in good demand in response to the increase in production that features tires and other major lines of rubber goods manufacturing.

The appearance is noted of a new rubber chemical known by the trade designation R.P.A. No. 1.[1] This is a softener of special merit for plasticizing crude rubber.

ACCELERATORS AND ANTIOXIDANTS. Prices are quite stable and liable to remain so unless there should be advances in the raw materials markets.

CARBON BLACK. Consumption actively increased each month since August and is expected to continue into next year to the extent of 10 to 15% at least. Contracts for supplies are being made by rubber companies for 1936 requirements on the basis of current prices, with reservation of the right by the sellers to revise prices July 1 on 15 days' notice.

DRY COLORS. No change in the price situation is developing. Demand has improved slightly.

FACTICE. The demand continues fair. Prices are subject to advances in some cases due to the strong position of crude materials.

LITHARGE. Contracts are being offered for the first half of 1936 at current 1935 rates.

SOLVENTS. There is a good steady demand from the rubber trade at stable prices.

TITANIUM PIGMENTS. Steady demand is noted with prices for 1936 contracts the same as current rates.

ZINC OXIDE. The current price for zinc oxide is materially lower than in a great many years, but producers generally are contracting for the sale of zinc oxide at the current price level for several months ahead. This fact indicates that there will probably be no price advance for a few months.

[1] See p. 50.

New York Quotations

November 25, 1935

Prices Not Reported Will Be Supplied on Application

Abrasives

Pumicestone, powdered	lb.	$0.02 /$0.03½
Rottenstone, domestic	lb.	.03 / .03½
Silica, 15	ton	38.00

Accelerators, Inorganic

Lime, hydrated	ton	20.00
Litharge (commercial)	lb.	.06½/ .07
Magnesia, calcined, heavy	lb.	.04
carbonate	lb.	.06½/ .07

Accelerators, Organic

A-1	lb.	.21 / .25
A-5-10	lb.	.33 / .36
A-10	lb.	
A-11	lb.	.60 / .75
A-16	lb.	.55 / .65
A-19	lb.	.56 / .75
A-32	lb.	.70 / .80
A-77	lb.	
Accelerator 49	lb.	.40 / .50
85	lb.	
87	lb.	
122	lb.	
552	lb.	
808	lb.	
833	lb.	
Acrin	lb.	
Aldehyde ammonia	lb.	
Altax	lb.	
Beutene	lb.	
Butyl Zimate	lb.	
C-P-B	lb.	
Captax	lb.	
Crylene	lb	
Paste	lb.	
D-B-A	lb.	
Di-Esterex	lb.	
Di-Esterex-N	lb.	
DOTG	lb.	.44 / .54
D.O.T.T.U.	lb.	
DPG	lb.	.35 / .45
Ethylideneaniline	lb.	
Formaldehyde P.A.C.	lb.	
Formaldehydeaniline	lb.	
Formaldehyde-para-toluidine	lb.	
Guantal	lb.	.42 / .51
Hepteen	lb.	
Base	lb.	
Hexamethylenetetramine	lb.	
Lead oleate, No. 999	lb.	.11
Witco	lb.	.11
Methylenedianilide	lb.	
Monex	lb.	
Novex	lb.	
Ovac	lb.	
Pipsolene	lb.	
R-2	lb.	1.50 / 1.90
Base	lb.	4.55 / 5.00
R & H 50-D	lb.	
Safex	lb.	
Super-sulphur No. 1	lb.	
No. 2	lb.	
Tepidone	lb.	
Tetrone A	lb.	
Thiocarbanilide	lb.	
Thionex	lb.	
Trimene	lb.	
Base	lb.	
Triphenyl guanidine (TPG)	lb.	
Tuads	lb.	
Ureka	lb.	$0.62 /$1.00
Blend B	lb.	
C	lb.	.58 / .69
Vulcanex	lb.	
Vulcanol	lb.	
Vulcone	lb.	
Z-B-X	lb.	
Z-88-P	lb.	.48 / .60
Zenite	lb.	
A	lb.	
B	lb.	
Zimate	lb.	

Activator

Barak	lb.	

Age Resisters

Age-Rite Gel	lb.	
HP	lb.	
Powder	lb.	
Resin	lb.	
Syrup	lb.	
White	lb.	
Akroflex A	lb.	
B	lb.	
C	lb.	
Albasan	lb.	
Antox	lb.	
A-V-A-R	lb.	
B-L-E	lb.	
Flectol B	lb.	
H	lb.	
White	lb.	
M-U-F	lb.	
Neozone (standard)	lb.	
A	lb.	
C	lb.	
D	lb.	
E	lb.	
Oxynone	lb.	
Parazone	lb.	
Permalux	lb.	
Solux	lb.	
Thermoflex	lb.	
A	lb.	
V-G-B	lb.	

Alkalies

Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	3.00 / 4.00
liquid, 50%	100 lbs.	2.25
solid (700 lb. drums)	100 lbs.	2.60 / 3.60

Antiscorch Materials

Antiscorch T	lb.	
Cumar RH	lb.	.085
Retarder B	lb.	
W	lb.	
T-J-B	lb.	
U.T.B.	lb.	

Antisun Materials

Heliozone	lb.	
Sunproof	lb.	

Binder, Fibrous

Asbestos	ton	30.00

Brake Lining Saturants

B. R. C. No. 553	lb.	.015 / .017
B. R. T. No. 3	lb.	.015 / .017

Colors

BLACK

Lampblack (commercial)	lb.	$0.15

BLUE

Brilliant	lb.	
Prussian	lb.	.40
Toners	lb.	.80 /$3.50
Ultramarine, dry, Group 1	lb.	.14

BROWN

Mapico	lb.	.13

GREEN

Brilliant	lb.	
Chrome, light	lb.	.20
medium	lb.	.20
oxide	lb.	.18½
Dark	lb.	
Guignet's	lb.	.70
Light	lb.	
Toners	lb.	.85 / 3.50

ORANGE

Lake	lb.	
Toners	lb.	.40 / 1.60

ORCHID

Toners	lb.	1.50 / 2.00

PINK

Toners	lb.	1.50 / 4.00

PURPLE

Permanent	lb.	
Toners	lb.	.60 / 2.00

RED

Antimony		
Crimson, 15/17%	lb.	.50
R. M. P. No. 3	lb.	.46
Sulphur free	lb.	.48
Golden 15/17%	lb.	.28
7-A	lb.	.33
Z-2	lb.	.20
Aristi	lb.	1.70
Cadmium	lb.	.75 / .80
Chinese	lb.	
Crimson	lb.	
Mapico	lb.	
Medium	lb.	
Rub-Er-Red	lb.	.09¼
Scarlet	lb.	
Toners	lb.	.80 / 2.00

WHITE

Lithopone (bags)	lb.	.04½/ .04¾
Albalith Black Label-11	lb.	.04½/ .04¾
Astrolith (5-ton lots)	lb.	.04½/ .04¾
Azolith	lb.	.04½/ .04¾
Cryptone-19	lb.	.06 / .06¼
CB-21	lb.	.06 / .06¼
ZS No. 20	lb.	.10½/ .10¾
No. 86	lb.	.10½/ .10¾
Sunolith (5-ton lots)	lb.	.04½/ .04¾
Ray-Bar	lb.	
Ray-Cal	lb.	
Rayox	lb.	
Titanolith (5-ton lots)	lb.	.06 / .06¾
Titanox-A (50-lb. bags)	lb.	.17 / .18½
B (50-lb. bags)	lb.	.06 / .06¼
C (50-lb. bags)	lb.	.06 / .06¼
Ti-Tone	lb.	

Zinc Oxide			
Anaconda, Green Seal			
No. 333	lb.	$0.06	/$0.06¼
Lead Free No. 352	lb.	.05	/ .05¼
No. 570	lb.	.05	/ .05¼
No. 577	lb.	.05	/ .05¼
Red Seal No. 222	lb.	.05½	/ .05¾
U.S.P. No. 777 (bbls.)	lb.	.08	
White Seal No. 555	lb.	.06½	/ .06¾
Azo ZZZ-11	lb.	.05	/ .05¼
44	lb.	.05	/ .05¼
55	lb.	.05	/ .05¼
66	lb.	.05	/ .05¼
French Process, Florence			
White Seal-7 (bbls.)	lb.	.06½	/ .06¾
Green Seal-8	lb.	.06	/ .06¼
Red Seal-9	lb.	.05½	/ .05¾
Kadox, Black Label-15	lb.	.05	/ .05¼
Blue Label-16	lb.	.05	/ .05¼
Red Label-17	lb.	.05	/ .05¼
Horse Head Special 3	lb.	.05	/ .05¼
XX Red-4	lb.	.05	/ .05¼
23	lb.	.05	/ .05¼
72	lb.	.05	/ .05¼
78	lb.	.05	/ .05¼
80	lb.	.05	/ .05¼
103	lb.	.05	/ .05¼
110	lb.	.05	/ .05¼
St. Joe (lead free)			
Black Label No. 20	lb.	.05	/ .05¼
Green Label No. 42	lb.	.05	/ .05¼
Red Label No. 30	lb.	.05	/ .05¼
U.S.P. X	lb.	.08	/ .08¼
YELLOW			
Cadmolith (cadmium yellow)	lb.	.40	/ .45
Lemon	lb.		
Mapico	lb.	.09½	
Toners	lb.	2.50	
Dispersing Agents			
Bardol	lb.	.021	/ .023
Darvan	lb.		
Factice—See Rubber Substitutes			
Fillers, Inert			
Asbestine, c.l., f.o.b. mills	ton	15.00	
Barytes	ton	30.00	
f.o.b St. Louis (50 lb. paper bags)	ton	22.85	
off color, domestic	ton	20.00	/25.00
white, imported	ton	29.00	/32.00
Blanc fixe, dry, precip.	lb.	.03½	/ .05
Calcene	ton	35.00	/43.00
Glue	lb.	.07	/ .09
Infusorial earth	lb.	.02	
Kalite No. 1	ton		
No. 3	ton		
Whiting			
Columbia Filler	ton	9.00	/14.00
Domestic	100 lbs.		
Guilders	100 lbs.		
Hakuenka	lb.		
Paris white, English cliff-stone	100 lbs.		
Southwark Brand, Commercial	100 lbs.		
All other grades	100 lbs.		
Suprex, white, extra light	ton	45.40	/60.00
heavy	ton	45.40	/60.00
Witco, c.l.	ton	7.00	
Wood flour	ton	21.00	/50.00
Fillers for Pliability			
Fumonex, c.l., f.o.b. works	lb.	.03	
ex-warehouse	lb.	.04½	
P-33	lb.		
Thermax	lb.		
Velvetex	lb.	.03	/ .04½
Finishes			
IVCO lacquer, clear	gal.		
colors	gal.		
Rubber lacquer, clear	gal.		
colored	gal.		
Starch, corn, pwd.	100 lbs.	3.38	/ 3.58
potato	lb.	.04½	/ .05½
Talc	ton	25.00	/45.00
Dusting	ton		
Pyrax	ton		
Flock			
Cotton flock, dark	lb.	.11	/ .12
dyed	lb.	.50	/ .85
white	lb.	.14½	/ .19
Rayon flock, colored	lb.	1.15	/ 1.60
white	lb.	1.00	/ 1.25
Latex Compounding Ingredients			
Alphasol-OS	lb.		
Antox, dispersed	lb.		
Aquarex D	lb.		
F	lb.		
Aresklene	lb.		
Casein, domestic, ground, 20-30 mesh	lb.	.15	/ .15½
Catalpo	ton		
Color pastes, dispersed	lb.		
Dispersaid	lb.	1.50	
Dispersex 15	lb.	.95	
20	lb.	.75	
Emo, brown	lb.	.13	
white	lb.	.13	
Factice Compound, dispersed	lb.	.25	
Heliozone, Dispersed	lb.		
Igepon A	lb.		
Micronex, Colloidal (75 lbs.)	lb.	$0.11	
320 lbs.	lb.	.08	
Nekal BX (dry)	lb.		
Palmol	lb.	.09	
Stablex A	lb.	1.75	
B	lb.	.90	
C	lb.	.30	
Sulphur, Colloidal	lb.		
Vulcan Colors	lb.		
Zinc oxide, Colloidal	lb.		
Mineral Rubber			
B. R. C. No. 20	lb.	.0125/$0.014	
Black Diamond	ton	25.00	
Genasco Hydrocarbon, granulated, (fact'y)	ton		
solid	ton		
Gilsonite Hydrocarbon (factory)	ton		
Hydrocarbon, hard	ton		
soft	ton		
Parmr Grade 1 (f.o.b. Bayonne)	ton	30.00	
Grade 2	ton	30.00	
Pioneer	ton		
265°	ton		
Mold Lubricants			
Mold Paste No 1	lb.		
Rusco mold paste	lb.	.12	/ .30
Sericite	ton	65.00	/70.00
Soapbark	lb.		
Soapstone	ton	25.00	/35.00
Oil Resistant			
AXF	lb.		
Reclaiming Oils			
B. R. V.	lb.	.039	/ .041
S. R. O.	lb.	.012	/ .014
Reenforcers			
Carbon Black			
Aerfloted Arrow Specification Black	lb.	.0535/	.0825
Arrow Compact Granualized Carbon Black	lb.		
"Certified" Spheron, Cabot	lb.		
Disperso (delivered)	lb.	.0445/	.0535
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local stock delivered	lb.	.07	/ .08¼
Dixiedensed, c.l, f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local stock delivered	lb.	.07	/ .08¼
Excello, c.l., f.o.b Gulf ports	lb.	.0445/	.0645
delivered New York	lb.	.0535/	.0735
l.c.l., delivered New York	lb.	.07	/ .08¼
Gastex	lb.	.03	/ .07
Kosmobile, c.l., f.o.b New Orleans, La., Galveston or Houston, Tex.	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local stock delivered	lb.	.07	/ .08¼
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local stock delivered	lb.	.07	/ .08¼
Micronex Beads	lb.		
Mark II	lb.		
Standard	lb.		
W-5	lb.		
W-6	lb.		
Pelletex	lb.	.03	/ .07
Supreme, c.l., f.o.b. Gulf ports	lb.	.0445/	.0645
delivered New York	lb.	.0535/	.0735
l.c.l., delivered New York	lb.	.07	/ .08¼
Carbonex	lb.	.030	/ .0375
Carbonex "S"	lb.	.0315/	.040
Clays			
Aerfloted Paragon	ton	8.50	
Suprex No. 1 Selected	ton	10.00	
No. 2 Standard	ton	8.50	
Dixie	ton		
Junior	ton		
McNamee	ton		
Par	ton		
Witco	ton	8.50	
Cumar EX	lb.	.04	
Reodorants			
Amora A	lb.		
B	lb.		
C	lb.		
D	lb.		
Para-Dors	lb.		
Rodo No. 0	lb.		
No. 10	lb.		
Rubber Substitutes or Factice			
Amberex	lb.	.30	
Black	lb.	.07	/ .11
Brown	lb.	.07	/ .12
Duphax A	lb.	.11	
B	lb.	.11	
Fac-Cel B	lb.	.125	
C	lb.	.125	
White	lb.	.08	/ .12
Softeners			
B. R. C. No. 555	lb.		
B. R. T. No. 7	lb.		
Burgundy pitch	lb.	$0.05	
(net weight)	lb.	.07	$0.08½
Cycline oil	gal.	.15	/ .28
Glycerine 88%, com.	lb.	.12¼	/ .13¼
Palm oil (Witco)	lb.	.05½	
Petrolatum, light amber	lb.	.03½	/ .03¾
Pigmentar (drums)	gal.	.25	/ .27
Pigmentaroil (drums)	gal.	.25	/ .27
Pine oil, dest. distilled (drums)	gal.	.44	/ .48
pitch	bbl.	6.00	
tar (drums)	gal.	.25	/ .27
Plastogen	lb.		
Reogen	lb.		
Rosin oil, compounded	gal.	.40	
RPA No. 1	lb.		
Rubtack	lb.	.10	
Tackoi	lb.	.085	/ .18
Tonox	lb.		
Powder	lb.		
Witco No. 20	gal.	.15	
Softeners for Hard Rubber Compounding			
RSL Resin	lb.		
Resin C Pitch 55° C. M. P.	lb.	.0125/	.0145
Resin C Pitch 70° C. M. P.	lb.	.0125/	.0145
Resin C Pitch 85° C. M. P.	lb.	.0125/	.0145
Solvents			
Benzol 90% (drums)	gal.	.23	
Beta-Trichlorethane	gal.		
Bondogen	lb.		
Carbon bisulphide	lb.	.05¼	/ .08½
tetrachloride	lb.	.05¼	
Dipentene, commercial (drums)	gal.	.42	/ .44
Rubber (Group 3, refinery)	gal.	.06¾	/ .07¼
Solvesso No. 1, tank cars	gal.	.15	
No. 2	gal.	.18	
No. 3	gal.	.15	
No. 4	gal.	.18	
Turpentine, wood, dest. distilled (drums)	gal.	.41	/ .43
Stabilizers for Cure			
Fatty acids (tank cars)	lb.	.07½	/ .08
Laurex, ton lots	lb.		
Oleic acid (tank cars)	lb.	.08¼	/ .09¼
Stearex B	lb.	.10¾	/ .11¾
Beads	lb.	.084	/ .094
Stearic acid, double pressed	lb.	.10	/ .11
single pressed	lb.	.09	/ .10½
triple pressed	lb.	.12¾	/ .13¾
Stearite	lb.	.08	
Zinc stearate	lb.	.22	
Synthetic Rubber			
"DuPrene"[1] Latex Type 50	gal.		
Type D	lb.		
"Thiokol" A (f.o.b. Yardville	lb.	.35	
Coating Materials	gal.	3.00	/ 6.00
D	lb.	.75	
Molding Powder	lb.	.75	
Tackifier			
B. R. H. No. 2	lb.	.015	/ .020
Varnish			
Shoe	gal.	1.45	
Vulcanizing Ingredients			
Sulphur			
Chloride, drums	lb.	.03½	/ .04
Rubber	100 lbs.	1.95	/ 2.75
Telloy	lb.		
Vandex	lb.		
(See also Colors—Antimony)			
Waxes			
Carnauba, No. 3 chalky	lb.	.38½	/ .39
2 N.C.	lb.	.43	
3 N.C.	lb.	.39	/ .39½
1 Yellow	lb.	.50	/ .51
2	lb.	.49	/ .50
Montan, crude	lb.	.11	

[1] Trade mark registered.

New Rubber-Resin Combinations

New Bakelite-rubber combinations employed for the manufacture of brake linings, clutch facings, and similar products are being introduced. Sections consisting of asbestos filled material bonded with a combination of two parts rubber and one part of Bakelite resin have greatly increased heat resistance. The thermoplasticity at temperatures such as 400° F. has been greatly minimized. A distinct improvement in wear resistance at high temperatures is obtained with this new combination.

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Sept. 28	Nov. 2	Nov. 9	Nov. 16	Nov. 23
Oct.	10.46	.....	.....	.....	.....
Nov.	.....	11.00	11.49	11.98	.....
Dec.	10.44	10.95	11.39	11.88	11.83
Mar.	10.55	10.80	11.25	11.70	11.64
July	10.69	10.78	11.20	11.55	11.43
Sept.	.....	10.68	11.08	11.41	11.25
Oct.	.....	10.62	11.02	11.33	11.15

THE above table gives the nearest first and last week-end closing prices of the month previous to that under review, also the week-end closing prices of each week of last month up to time of going to press. This plan permits tracing at a glance the prices of representative futures for approximately two consecutive months.

Middling cotton has been gradually moving into higher price levels since the drop occasioned at the time of the Government's new 10¢ loan plan. As has been true during the past year, the Government continues to be the principal marketing factor, which causes cautions among traders. Prices during November fluctuated through a fairly narrow range, however, in a manner to give an upward trend. This was basically due to a reduction in the crop outlook as given in the Government forecast of November, showing 11,141,000 bales as against the October forecast of 11,489,000; lower-than-expected China and North Brazilian crops; and marked increases in both exports and domestic demand. The visible supply at the beginning of November was 6,112,000 bales, compared with 6,775,000 for the same time last year. Likewise the forwardings were 3,030,000 bales and exports 1,406,000 as against 2,507,000 and 1,344,000 respectively last year.

The price passed 12¢ per pound November 14, which placed the Government in a position for the first time this fall whereby bonuses were not payable to the selling producer under the plan whereby the Government agreed to pay him the difference between the average selling price in ten designated southern spot markets and 12¢.

Loans this year are running far below expectations. Ten-cent loans have been taken on only 38,157 bales up to November 12, and of these 201 repaid; whereas loans were made on 4,430,000 bales during last year with very few ever repaid.

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. Coarse yarn constructions have the advance reported last month. Even so, mill products are said to have advanced more slowly than that of the raw material. The volume of business is good and has been slowly increasing. Consumers are showing a disposition to make forward commitments farther into the future than cotton manufacturers are inclined to accept at present prices.

RAINCOAT FABRICS. Business in this line is very quiet since the fall season is over and the spring season's line is now in the styling stage.

SHEETINGS. Prices continue to advance. Buying also has increased, not only for mechanical goods but for converting fabrics as well.

TIRE FABRICS. Prices are steady and unchanged in the face of moderate demand.

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
Nov. 2	11.35
Nov. 9	11.57
Nov. 16	12.17
Nov. 23	12.29

New York Quotations

November 25, 1935

Drills		
38-inch 2.00-yard	yd.	
40-inch 3.47-yard		.09½
50-inch 1.52-yard		.22⅜
52-inch 1.85-yard		.18⅝
52-inch 1.90-yard		.16½
52-inch 2.20-yard		.15¼
52-inch 2.50-yard		.13½
59-inch 1.85-yard		.17
Ducks		
38-inch 2.00-yard D. F.	yd.	.16½/.16⅝
40-inch 1.45-yard S. F.		.22¾
51½-inch 1.35-yard D. F.		.23¾
72-inch 1.05-yard D. F.		.32⅞/.33¾
72-inch 17.21-ounce		.38⅛
MECHANICALS		
Hose and belting	lb.	.35
TENNIS		
52-inch 1.35-yard	yd.	.23⅞
***Hollands**		
GOLD SEAL		
30-inch No. 72	yd.	.19
40-inch No. 72		.20
RED SEAL		
30-inch	yd.	.16½
40-inch		.17½
50-inch		.23
Osnaburgs		
40-inch 2.34-yard	yd.	.12 /.13½
40-inch 2.48-yard		.11⅜/.12¾
40-inch 2.56-yard		.11
40-inch 3.00-yard		.10½
40-inch 7-ounce part waste		.11⅞
40-inch 10-ounce part waste		.16¾
37-inch 2.42-yard		.13
Raincoat Fabrics		
COTTON		
Bombazine 60 x 64	yd.	.09½
Plaids 60 x 48		.11¼
Surface prints 60 x 64		.12½
Print cloth, 38½-inch, 60 x 64		.06⅜
SHEETINGS, 40-INCH		
48 x 44, 2.50-yard	yd.	.11⅛
64 x 68, 3.15-yard		.10¾
56 x 60, 3.60-yard		.09⅝
44 x 48, 3.75-yard		.07⅛
SHEETINGS, 36-INCH		
48 x 40, 5.00-yard	yd.	.06⅜
44 x 40, 6.15-yard		.05¼
Tire Fabrics		
BUILDER		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.36
CHAFER		
14 ounce 60" 20/8 ply Karded peeler	lb.	.36
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.34
CORD FABRICS		
23/5/3 Karded peeler, 1/16" cotton	lb.	.36
15/3/3 Karded peeler, 1/16" cotton	lb.	.34
23/5/3 Karded peeler, 1¼" cotton	lb.	.40
23/5/3 Combed Egyptian	lb.	.52
LENO BREAKER		
8¾ ounce and 10¼ ounce 60" Karded peeler	lb.	.36

*For less than 1,000 yards of a width add 10% to given prices.

RUBBER SCRAP

THE market for all grades holds very steady and firm, with a slight upward rise in tube grades as noted below.

BOOTS AND SHOES. All grades are very firm, steady, and unchanged from quotations of one month ago. Collections are moderate.

INNER TUBES. Demand for all grades of tubes continues very good, particularly so with respect to Reds and No. 1. Prices on these, also on Mixed, have strengthened considerably. Export demand for tubes is very good.

TIRES. These stocks are in better demand than one month ago, with prices trending a little higher.

SOLID TIRES. The demand for both domestic and foreign consumption is showing a slight improvement. Prices are steady.

MECHANICALS. All grades are firm and in fair demand. Prices remain unchanged since last month.

HARD RUBBER. Stocks are very scanty. The actual supply is diminishing. Prices are unchanged.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)

November 25, 1935

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01 /$0.01⅛
Colored	lb.	.00¾/ .00⅞
Untrimmed arctics	lb.	.00¾/ .00⅞
Inner Tubes		
No. 1, floating	lb.	.08½/ .09
No. 2, compound	lb.	.03½/ .03⅝
Red	lb.	.03⅜/ .03½
Mixed tubes	lb.	.03¼/ .03⅜
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	7.50 / 8.00
Beadless	ton	11.75 /12.00
Auto tire carcass	ton	9.50 /10.00
Black auto peelings	ton	16.00 /17.00
Solid		
Clean mixed truck	ton	35.00 /36.00
Light gravity	ton	38.00 /39.00
Mechanicals		
Mixed black scrap	ton	15.00 /17.00
Hose, air brake	ton	14.00 /15.00
Garden, rubber covered	ton	13.00 /13.50
Steam and water, soft	ton	13.00 /13.50
No. 1 red	lb.	.02⅜/ .02½
No. 2 red	lb.	.01½/ .01¾
White druggists' sundries	lb.	.02¾/ .03
Mechanical	lb.	.02 / .02½
Hard Rubber		
No. 1 hard rubber	lb.	.11½/ .11½

A New High Record of *14 Miles*

Stratosphere Balloon Fabrics Furnished by Wellington Sears Co.

The Goodyear Zeppelin Corporation, Akron, Ohio, constructed the bag of the stratosphere balloon used in the recent successful flight made by Captains Albert W. Stevens and Orvil A. Anderson under the auspices of the National Geographic Society and the U. S. Army Air Corps from fabrics secured chiefly from Wellington Sears Company.

In their construction of this record-breaking balloon they used three fabrics—distributed according to accurately calculated determination of the stresses to be met. The characteristics of these Wellington Sears fabrics are shown below:

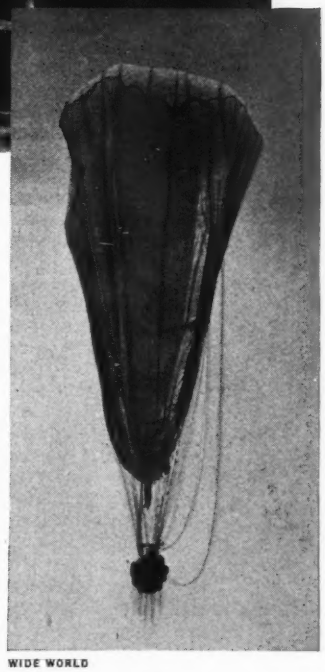
Fabric	*Threads per Inch*	*Weight per Sq. Yd.*	*Breaking Strength*
B. A. 30	80 x 80	4 oz.	80 lbs. per in.
B. B.	104 x 104	3 oz.	60 lbs. per in.
H. H.	130 x 138	2 oz.	40 lbs. per in.

WIDE WORLD

Capt. Albert W. Stevens and Capt. Orvil A. Anderson, Commander and Pilot respectively of the stratosphere balloon, warmly attired as they stand in front of their gondola just before taking off on their record-making flight.

These aeronautical fabrics have also been used this year on the record-breaking plane of Howard Hughes of California, on Benny Howard's "Mister Mulligan," winner of the Bendix and Thompson Trophies at the National Air Races; on the "Ole Miss," holder of the record for greatest time aloft—653 hours, 34 minutes, and on the Cessna C-34 Airplane which was judged the most efficient plane in the world at the National Air Races.

These records for these fabrics speak for themselves.



WIDE WORLD

The stratosphere balloon in which Capt. Albert W. Stevens, Flight Commander, and Capt. Orvil A. Anderson, the Pilot, soared to a height of 14 miles to set a new world's stratosphere record.

Wellington Sears Company

65 Worth Street New York, N. Y.

Other fabrics for the rubber industry include
COLUMBUS Sheeting, SHAWMUT Hose and Belting Duck, EQUINOX Boot Leg Duck, WEST POINT Osnaburg and Chafer Fabrics.

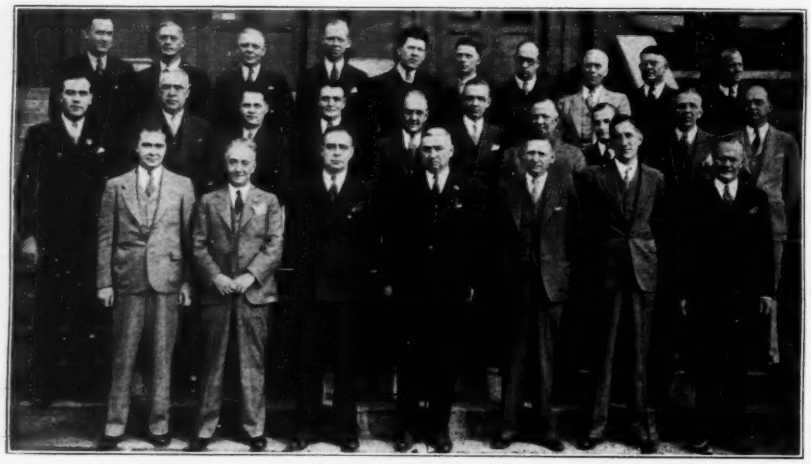
OHIO

(*Continued from page 60*)

ager of the Minneapolis district and A. J. Lueders, district credit manager, according to C. B. O'Connor, general sales manager of the Goodrich tire division. Mr. Jarman succeeds Adam Faris, resigned, and Mr. Lueders replaces R. N. Beaudry, assigned to other duties.

The Midwest Rubber Reclaiming Co., East St. Louis, Ill., has leased for one year the plant of the Akron Rubber Reclaiming Co., Barberton, O., shut down four years, where fifty men will start work about January 1 under R. R. Semler, who will be in charge of the plant. At present a crew of workmen is putting the Barberton factory in shape. Although listed as independent companies, the two firms are virtually under the same management. William Welch, president of the Midwest concern, is also vice president of the Akron plant, of which J. B. Huber is president. Consolidation of the two companies may take place in 1936.

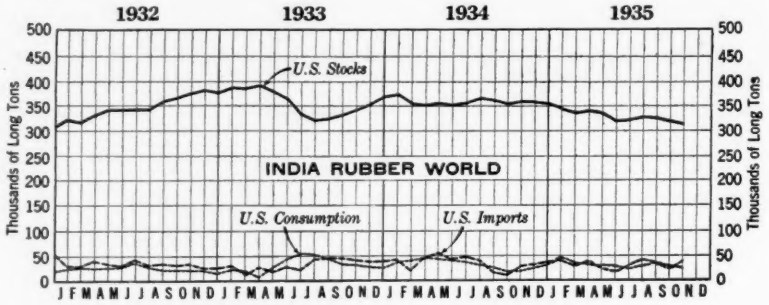
The Republic Rubber Co., Youngstown, on October 31 ended its three-day annual sales conference, one of the most successful ever held. It was under the direction of O. S. Dollison, vice president in charge of sales; while various discussions were led by H. P. Schultz, sales manager; E. M. Ikirt, treasurer; R. M. Gattshall, manager distributer sales; H. W. Croysdale, factory manager; C. H. Zieme, service engineer; and A. Brill, development manager. The conference marked the close of a very successful year for Republic, in which sales exceeded quotas in a satisfactory degree. During the meeting plans were outlined for an expanded program for the coming year, and several new products were shown to the sales organization, including a new improved molded and braided pneumatic hose to be introduced under the old Tower brand name and a transmission belt line of Super-Flex belting, an item especially designed for high speed and small pulley work.



Sales Force at the Republic Rubber Annual Conference

Front Row: E. M. Ikirt, R. M. Gattshall, H. P. Schultz, O. S. Dollison, H. W. Croysdale, A. Brill, C. H. Zieme; Second Row: M. C. Meyer, A. A. Schley, H. H. Sprinkle, G. L. Smith, N. M. Grove, J. H. Vandawarker, F. H. Howard, C. R. Conklin, C. E. Case, H. F. Morneweck; Top Row: W. E. Barnard, J. F. Vogt, C. W. Stanton, T. D. Britton, M. W. Clark, C. P. Nolte, S. R. Colucci, J. P. Bird, A. W. Carriere, H. W. Blair

IMPORTS, CONSUMPTION, AND STOCKS



United States Stocks, Imports, and Consumption

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Imports* Tons	U. S. Consumption Tons	U. S. Stocks Mfgrs., Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.—Public Warehouses, London, Liverpool†‡ Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net) Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1933	411,615	401,000	365,000	55,606	86,505	44,884	851,700	798,900	616,370
1934	469,484	453,223	355,000	47,644	134,927	62,142	1,016,715	959,556	678,994
1935									
January ..	42,059	47,103	346,084	42,066	148,337	59,609	79,825	89,216	671,954
February ..	35,383	43,187	337,332	42,969	155,727	57,586	75,746	90,494	658,717
March	44,041	42,620	338,700	44,485	162,012	55,100	66,671	88,112	652,659
April	43,545	44,714	334,954	37,651	165,064	48,827	76,534	80,261	652,471
May	26,866	41,568	319,281	44,375	167,745	54,740	77,939	71,543	649,991
June	38,340	36,623	320,470	55,581	171,303	51,770	74,598	66,043	648,579
July	46,880	36,384	330,528	49,018	174,227	49,958	71,305	79,719	655,154
August ...	38,665	39,242	329,548	47,724	177,250	46,482	77,584	80,391	659,851
September.	34,569	37,553	326,236	43,413	177,544	33,872	74,709	.....	643,325
October ...	34,356	42,436	317,850	49,913	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, and afloat.

CRUDE rubber consumption by United States manufacturers for October totaled 42,436 long tons, against 37,553 long tons for September, 1935, a 13% increase, and 31,253 (revised) long tons for October, 1934, a 35.8% increase, according to R.M.A. statistics.

Crude rubber imports for October were 34,356 long tons, less than 1% below the September figure of 34,569 long tons, and 2.7% under 35,298 long tons imported in October, 1934.

The estimated total domestic stocks of crude rubber on hand October 31 were 317,850 long tons, compared with September 30 stocks of 326,236 long tons and 362,571 long tons on hand October 31, 1934.

Crude rubber afloat to United States ports on October 31 was 49,913 long tons, against 43,413 long tons afloat on September 30 and 38,247 long tons afloat on October 31, 1934.

London and Liverpool Stocks

Week Ended	Tons London	Tons Liverpool
Nov. 2.....	94,178	76,363
Nov. 9.....	90,736	76,271
Nov. 16.....	90,145	76,154
Nov. 23.....	90,496	75,996

FINANCIAL

Company Reports

The American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y. Nine months ended September 30: consolidated net income of $2,533,969, after depreciation, depletion, interest, minority interest, and other charges, equal to $1 a share on 2,520,370 combined shares of class A and class B common stocks. This compares with $1,573,988, or 62¢ a share on combined class A and class B stocks in the similar period of 1934. Quarter ended September 30: net income of $1,040,289, or 41¢ a share on combined stocks against $855,375, or 34¢ a share on combined stocks, in the preceding quarter, and $507,842, or 20¢ a share, on combined stocks in the September quarter of 1934.

American Zinc, Lead & Smelting Co., Columbus, O., and subsidiaries. Nine months ended September 30: net loss after interest, depreciation, depletion, federal income taxes, and other charges, $158,241, against net profit of $154,608 last year. Quarter ended September 30: net loss after same charges, $58,799, compared with $21,151 in same quarter of 1934.

Anaconda Wire & Cable Co., 25 Broadway, New York, N. Y., and subsidiaries. Nine months ended September 30: net profit, indicated from quarterly reports, $681,232, after charges and federal taxes, equal to $1.61 a share on capital stock, against net profit of $658,254, or $1.55 a share, on stock in the first nine months of last year. Quarter ended September 30: Net income after taxes and all charges, $213,094, equal to 50¢ a share on 422,470 capital shares, compared with $141,440, or 33¢ a share, in 1934.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Nine months ended September 30: net profit of $40,154,667, equivalent, after dividends on the debenture stock, to $3.22 a share on 11,051,343 shares of common stock, the average number outstanding for the period. This compares with a net profit of $38,727,818, or $3.10 a share on 11,059,692 shares of common stock in the corresponding period of 1934. Quarter ended September 30: net profit of $17,704,182, or $1.48 a share on 11,050,703 common shares, compared with net profit of $15,174,220, or $1.24 a share on 11,055,711 common shares for the third quarter last year.

In the first nine months dividends received on the corporation's investment in 10,000,000 shares of General Motors stock were equivalent to $1.13 a share on the du Pont stock, equaling the amount received for the same period in 1934. For the third quarter dividends on General Motors investment equaled 68¢ a share on du Pont stock, which also equaled the amount for the corresponding period of 1934.

Fisk Rubber Corp., Chicopee Falls, Mass., and subsidiaries. Nine months ended September 30: net loss after taxes and other charges, $149,495, contrasted with net profit of $474,271, which was equal, after 6% preferred dividend requirements, to 66¢ a share on 447,356 $1-par common shares a year before. Sales totaled $8,657,988, against $7,742,977.

Monsanto Chemical Co., St. Louis, Mo., and subsidiaries, including the Swann Corp. and its subsidiaries. Nine months ended September 30: net profit, $2,732,999, after charges and taxes, equal to $2.76½ a share on 987,876 shares of capital stock. This compares with net profit, excluding Swann Corp., of $1,945,230, or $2.25 a share on 864,000 shares, for first nine months of 1934. Quarter ended September 30: net profit, $884,550, after depreciation, federal taxes, and other charges, equivalent to 89½¢ a share on 987,876 shares of stock, contrasted with a net profit for quarter ended September 30, 1934, of $566,195, or 65¼¢ a share, on 864,000 shares, not including Swann Corp.

The New Jersey Zinc Co., 160 Front St., New York, N. Y., reported for the nine months ended September 30 a net profit of $3,342,216 after taxes, depreciation, depletion, contingencies, and other charges, equivalent to $1.70 a share on 1,963,264 shares of $25-par stock. In the corresponding period of 1934 the net profit was $2,833,149, or $1.44 a share. Net profit for the third quarter of 1935 was $1,168,003, including proceeds of $221,375 from patents, and after the deductions mentioned. This is equal to 59¢ a share, against a net profit of $1,113,324, or 57¢ a share, in the second quarter of this year, and with a net profit of $746,637, or 38¢ a share, in the third quarter of 1934.

Raybestos-Manhattan, Inc., Passaic, N. J. Nine months ended September 30: net income of $1,108,902.15, equivalent to $1.75 per share, compared with net income of $892,838.55, or $1.39 per share, during the same period in 1934. The balance sheet at September 30, 1935, revealed total assets of $17,447,594.52, including $8,523,846.90 of current assets. The company had no banking or funded debt or other capital obligations. The book value of its 635,200 shares of stock outstanding, after deducting the 40,812 shares held in the treasury, was $23.95 per share. The net current assets represented $11.54 per share, of which cash and marketable securities amounted to $4.16 per share.

Thermoid Co., Trenton, N. J., and wholly owned domestic subsidiaries exclusive of Southern Asbestos Co., Charlotte, N. C. Nine months ended September 30: net profit after interest, depreciation, taxes, and other charges, $120,452, equal to $3.96 a share on 30,417 $100 par shares of 7% cumulative convertible preferred stock, on which unpaid dividends have accumulated. This compares with net loss of $859 in same period last year. Quarter ended September 30: profit before taxes, $1,375, compared with loss before taxes of $78,306 in third quarter of 1934.

United Carbon Co., Charleston, W. Va., and subsidiaries, for the nine months ended September 30 reported net profit of $1,363,721 after federal taxes and charges, equal to $3.43 a share on 397,885 shares of no par common stock. This compares with net profit of $988,413 or $2.53 a share on 370,127 shares of common in the first nine months of 1934. September quarter showed a net profit of $425,752, or $1.07 a share, against $460,336, or $1.16 a share, in the preceding quarter and $318,040 or 86¢ a share in the September quarter last year.

New Incorporations

Farrington Rubber Co., Patrick's Corner, N. J. Capital 1,000 shares, no par value. M., H., and T. Patrick, all of Patrick's Corner. Manufacture all kinds of rubber products.

General Tire Service, Inc., Providence, R. I. Capital $10,000 consisting of 100 shares of common stock at $100 each. E. R. Devine, J. E. Carr, and H. R. Richards, all of Providence.

Major Tire & Rubber Co., Inc., 1000 W. 63rd St., Chicago, Ill. Capital 1,500 shares of common stock, no par value. J. B. and S. H. Newman and D. Bilski. Correspondent: Bullas & Rivkin, Suite 1720, Steuben Bldg., 188 W. Randolph St. Manufacture automobile tires and inner tubes.

Oliver Tire & Rubber Co., Bridgeport, Conn. Capital $50,000; par, $100; paid, $3,000. E. H. Oliver and M. and O. W. Svihra.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Boston Woven Hose & Rubber Co.	6% Pfd.	$3.00 s. a.	Dec. 16	Dec. 2
Firestone Tire & Rubber Co.	Pfd.	$1.50 q.	Dec. 1	Nov. 15
Gates Rubber Co.	Pfd.	$1.75 q.	Dec. 2	Nov. 15
Goodyear Tire & Rubber Co.	1st Pfd.	$1.00	Jan. 2	Nov. 30
Hope Webbing Co.	Com.	$1.50 q.	Nov. 1	Oct. 15
I. B. Kleinert Rubber Co.	Com.	$0.10 s. a.	Oct. 30	Oct. 15
Pahang Rubber Co., Ltd.	Com.	$0.05	Dec. 20	Dec. 13
Plymouth Rubber Co., Inc.	7% Pfd.	$1.75 q.	Oct. 15	Sept. 26
Raybestos-Manhattan, Inc.	Com.	$0.25 q.	Dec. 14	Nov. 29
Rex-Hide Rubber Mfg. Co.	Com.	$0.50 ex.	Dec. 15	Nov. 30
Tyer Rubber Co.	6% Pfd.	$1.50 q.	Nov. 15	Nov. 9
United Elastic Corp.	Com.	$0.10 q.	Dec. 24	Dec. 5

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge.*

SITUATIONS WANTED

EXPERIENCED RUBBER CHEMIST, FAMILIAR WITH COMpounding and development of factory stocks, also mixing, curing and stress-strain graphs of test slabs, aging tests and analyses. Address Box No. 586, care of INDIA RUBBER WORLD.

BRAKE LINING MAN, WITH TEN YEARS' EXPERIENCE SALES service, development, research, testing, manufacturing processes, management, desires connection with progressive manufacturer. Address Box No. 589, care of INDIA RUBBER WORLD.

WANTED: POSITION AS DEPARTMENT FOREMAN IN SPREADing, etc. Experienced in all kinds of rubberized fabrics, quarter linings, proofings, combinings, etc. Address Box No. 590, care of INDIA RUBBER WORLD.

MAN, WELL VERSED IN RUBBER FACTORY MANAGEMENT, including office, purchasing, payroll and cost work, desires congenial employment. Small salary accepted. Address Box No. 592, care of INDIA RUBBER WORLD.

EXPERIENCED RUBBER FACTORY EXECUTIVE DESIRES INvestment opportunity and active employment with small rubber manufacturing company. Worthy of confidence. Address Box No. 593, care of INDIA RUBBER WORLD.

RUBBER CHEMIST AND COMPOUNDER. NINE years' experience, chiefly mechanicals and dipped goods, including latex. Address Box No. 594, care of INDIA RUBBER WORLD.

POSITION WANTED BY MAN WITH YEARS OF EXPERIENCE IN producing a general line of mechanicals such as belting, hose, mattings, packings, and small molded articles. Have been factory superintendent the past several years. Desirous of making change. Address Box No. 595, care of INDIA RUBBER WORLD.

PRODUCTION AND SALES EXECUTIVE DESIRES CONNECTION with progressive plant with possible investment. Fifteen years' experience in production supervision, development work and sales, molded and extruded specialties, and sponge rubber products. Address Box No. 596, care of INDIA RUBBER WORLD.

POSITION WITH PROGRESSIVE COMPANY MANUFACTURING hard rubber or mechanicals, as superintendent, development or selling capacity. Qualified by long experience in similar capacities with reputable concerns. Diplomatic, energetic, capable, and practical executive. Address Box No. 600, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

WANTED: NEAR BOSTON, FACTORY MAN EXPERIENCED IN latex dipped goods. Furnish information regarding experience and salary. Address Box No. 588, care of INDIA RUBBER WORLD.

LATEX: TECHNICAL DEPARTMENT OF ESTABLISHED FIRM desires man with broad latex experience in laboratory and plant to develop processes of interest to sponge rubber industry. Outline experience, salary desired, etc., in first letter. Our organization has been advised of this advertisement. Address Box No. 597, care of INDIA RUBBER WORLD.

WANTED: RUBBER TILE SALESMEN ON STRAIGHT COMMISsion basis only for New England and Middle Atlantic States. Address Box No. 599, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

FACTORY REPRESENTATIVES WANTED IN KEY CITIES TO secure special molded work on commission basis by eastern factory thirty years in this line. Address Box No. 587, care of INDIA RUBBER WORLD.

FOR SALE OR RENT: RUBBER PLANT. WILL EQUIP WITH machinery suitable for any line. Address Box No. 591, care of INDIA RUBBER WORLD.

ESTABLISHED RUBBER BROKER, HAVING INTIMATE CONtact with rubber factories, wishes to make connection with manufacturers desiring New England representation. Address Box No. 598, care of INDIA RUBBER WORLD.

RUBBER TRADE

Akron, Ohio, firm, well introduced to the rubber trade, desires to handle additional lines acceptable to the rubber industry. Has facilities for storage and equipped to handle carloads or less. Address Box No. 601, care of INDIA RUBBER WORLD.

(*Advertisements continued on page 79*)

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.	Australia	Belgium	Canada	Central Europe	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1933	**398,400**	**73,300**	**13,500**	**11,200**	**19,300**	**18,900**	**63,100**	**54,100**	**19,300**	**66,900**	**30,800**	30,100	798,900
1934	**438,941**	**158,481**	**9,642**	**9,116**	**28,439**	**23,427**	**50,405**	**59,130**	**21,403**	**69,934**	**47,272**	43,166	959,556
1935													
Jan.	39,546	20,383	1,099	419	2,670	1,966	5,678	4,286	1,648	4,402	3,446	3,673	89,216
Feb.	45,999	15,609	848	399	1,558	2,547	4,670	3,513	4,357	5,585	1,810	3,599	90,494
Mar.	44,772	12,810	1,458	240	2,710	1,463	4,085	6,353	1,582	4,423	4,624	3,592	88,112
Apr.	40,061	11,574	1,150	520	1,063	1,491	3,368	5,820	1,653	6,635	3,387	3,539	80,261
May	29,962	12,498	671	982	3,929	1,565	3,900	6,050	935	5,432	1,937	3,682	71,543
June	31,410	10,253	496	1,065	1,435	1,576	3,270	4,551	1,831	3,375	3,088	3,693	66,043
July	47,694	9,454	520	572	1,319	1,079	3,308	4,929	1,298	4,486	1,823	3,237	79,719
Aug.	41,057	14,120	655	527	2,814	1,738	4,593	4,790	916	4,454	1,227	*3,500	80,391

* Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Total	Philippines and Oceania	Africa	South America	Mexican Guayule	Grand Total
1933	445,800	280,800	63,800	1,500	3,400	7,800	11,100	7,000	17,300	838,500	1,100*	2,000	10,100	0	851,700
1934	467,030	379,401	79,068	5,735	5,719	11,086	17,708	17,714	19,559	1,003,020	1,233*	2,921	9,143	398	1,016,715
1935															
Jan.	41,665	18,726	6,294	1,552	945	1,238	1,536	2,614	2,575	77,145	105	467	2,108	0	79,825
Feb.	32,824	27,835	5,551	344	489	760	1,880	2,288	2,018	73,989	156	254	1,347	0	75,746
Mar.	34,047	22,402	1,720	269	471	773	1,874	2,076	1,440	65,072	82	525	992	0	66,671
Apr.	37,442	26,156	3,749	250	263	846	1,875	1,661	2,827	75,069	134	185	1,146	0	76,534
May	27,740	36,289	4,473	322	484	848	1,977	2,752	1,800	76,685	133	315	756	50	77,939
June	31,198	29,337	3,525	651	383	603	1,983	2,869	2,516	73,065	142	393	895	103	74,598
July	37,826	20,990	4,106	351	229	1,164	1,752	1,939	1,957	70,314	125	407	407	52	71,305
Aug.	40,990	21,154	5,683	732	102	566	776	2,062	3,662	75,727	100*	500*	1,207	50	77,584
Sept.	40,936	20,376	4,053	561	120	421	1,797	2,278	2,248	72,790	120*	500*	1,249	50*	74,709

*Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

U. S. Crude and Waste Rubber Imports for 1935

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Totals 1935	Totals 1934	Balata	Miscellaneous	Waste
Jan. ....*tons*	41,188	599	201	30	41	..	..	42,059	46,204	26	553	..
Feb.	33,722	388	1,208	14	51	..	..	35,383	31,032	73	194	29
Mar.	42,373	967	513	167	21	..	..	44,041	44,605	55	659	40
Apr.	41,857	1,089	531	63	5	..	..	43,545	45,662	60	644	14
May	25,256	1,106	294	60	..	50	..	26,766	47,954	55	474	16
June	36,833	860	467	80	..	100	..	38,340	49,683	135	521	20
July	45,456	973	291	46	14	100	..	46,880	41,530	84	553	25
Aug.	37,199	1,170	166	65	5	50	..	38,655	33,248	25	484	18
Sept.	33,329	940	196	70	17	17	..	34,569	28,835	83	276	30
Oct.	32,816	1,236	143	43	75	43	..	34,356	35,298	27	555	26
Total 10 mos., 1935 ....*tons*	370,029	9,328	4.010	638	229	360	..	384,594	.....	623	4,913	218
Total 10 mos., 1934 ....*tons*	391,024	9,669	2,773	136	49	400	..	.....	404,051	1,022	5,647	643

Compiled from The Rubber Manufacturers Association, Inc., statistics.

United States Latex Imports

Year	Pounds	Value
1931	10,414,712	$884,355
1932	11,388,156	601,999
1933	24,829,861	1,833,671
1934	29,276,134	3,633,253
1935		
Jan.	1,898,962	287,583
Feb.	1,282,941	179,583
Mar.	2,889,525	354,654
Apr.	3,854,892	415,100
May	3,197,450	380,844
June	1,324,776	152,665
July	2,563,366	303,518
Aug.	2,764,572	370,431
Sept.	2,347,111	291,652

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

Tire Production Statistics

	Pneumatic Casings—All Types: Inventory	Pneumatic Casings—All Types: Production	Pneumatic Casings—All Types: Total Shipments	Solid and Cushion Tires
1933	7,110,456	36,243,384	35,274,970	26,271	130,987	126,990
1934	9,171,335	45,815,763	45,285,955	34,710	197,497	187,152
1935						
Jan.	10,085,737	4,487,679	3,552,737	31,581	21,510	20,300
Feb.	11,183,674	4,251,183	3,188,772	.....	17,657	16,183
Mar.	11,325,010	4,215,214	4,078,007	.....	17,603	20,224
Apr.	10,673,140	4,376,383	4,989,291	.....	20,002	21,783
May	10,796,842	4,049,915	3,945,364	.....	22,533	21,150
June	10,432,738	3,792,537	4,134,489	.....	16,067	20,053
July	8,584,018	3,425,879	5,283,696	.....	21,904	20,287
Aug.	7,570,902	3,873,016	4,597,081	.....	31,970	30,127
Sept.	8,039,190	3,673,267	3,204,233	.....	28,468	23,796

	Inner Tubes—All Types: Inventory	Inner Tubes—All Types: Production	Inner Tubes—All Types: Total Shipments
1933	6,251,941	34,044,689	33,112,472
1934	8,904,496	44,840,971	43,694,130
1935			
Jan.	9,332,489	4,131,004	3,610,371
Feb.	10,151,721	4,046,062	3,261,488
Mar.	10,094,170	3,999,030	4,043,350
Apr.	9,864,446	4,131,658	4,319,648
May	10,296,437	3,775,145	3,347,258
June	9,748,054	3,376,082	3,903,645
July	7,765,239	3,153,068	5,111,012
Aug.	6,730,932	3,776,743	4,419,013
Sept.	7,337,698	4,001,165	3,322,750

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires: Cotton Fabric Pounds	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires: Crude Rubber Pounds	Consumption of Motor Gasoline (100%) Gallons
1933...	148,989,293	512,489,423	15,880,746,000
1934...	196,069,495	697,558,218	17,063,298,000
1935			
Jan....	19,607,932	72,968,356	1,178,604,000
Feb....	18,058,726	66,463,131	1,133,378,000
Mar....	17,581,651	64,583,859	1,343,874,000
Apr....	17,944,131	71,286,972	1,515,129,000
May...	17,328,212	67,822,472	1,641,738,000
June...	15,802,601	58,152,530	1,591,128,000
July...	14,867,923	56,042,744	1,730,526,000
Aug...	16,568,852	58,726,516	1,801,842,000
Sept...	15,096,484	57,002,155	1,590,204,000

Rubber Manufacturers Association, Inc., figures representing approximately 97% of the industry for 1934 and 1935 and 80% for previous years, with the exception of gasoline consumption.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	Commodity	City and Country
*9,569	Balloons	Cairo, Egypt
†9,587	Rubber goods	Athens, Greece
*9,593	Tires and tubes	Athens, Greece
†9,614	Druggists' sundries, bathing apparel, mechanical goods, boots, dental goods, and hot water bottles	Johannesburg, South Africa
‡9,618	Canvas fire hose	Merida, Mexico
‡9,620	Balloons	Montreal, Canada
†9,629	Sundries and specialties	Bogota, Colombia
‡9,639	Belting	Rotterdam, Netherlands
*9,646	Latex pilot balloons for meteorological purposes	Amsterdam, Netherlands
‡9,649	Druggists' sundries, surgical gloves, sheeting, tubing, and ice bags	Cairo, Egypt
*9,685	Elastic piece goods, nets, and laces for corsets	London, England

*Purchase. †Agency. ‡Purchase and agency.

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: ONE NO. 4 ROYLE TUBER, DIRECT MOTOR DRIVE; one Farrel Experimental Rubber Mill, 8 by 13″ Motor Drive; one 16 by 36″ Farrel Mill with 40 H.P. A.C. Motor and Thropp Reduction Gear Drive; Presses all sizes up to 60 by 60″; several Mills and Calenders up to 66″; Vacuum Shelf Driers, Werner and Pfleiderer Mixers; Banbury Mixers, Churns, etc. Send us your inquiries. What have you for sale? CONSOLIDATED PRODUCTS COMPANY, INC., 13-16 Park Row, New York, N. Y.

BUTTERWORTH CELL DRIER, SEVEN PLATE 50″ wide, in perfect condition. The Cincinnati Rubber Mfg. Co., Cincinnati, Ohio.

(*Advertisements continued on page* 81)

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	August, 1935		Eight Months Ended August, 1935	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	90,158,021	$10,419,056	716,255,666	$81,872,482
Liquid latex	2,764,572	370,431	19,776,484	2,444,378
Jelutong or pontianak	997,709	82,179	6,881,832	499,904
Balata	70,046	8,963	1,025,873	144,678
Gutta percha	327,958	43,654	3,142,684	433,967
Guayule	112,000	9,464	570,800	48,230
Scrap and reclaimed, etc.	759,590	7,473	4,889,111	57,096
Totals	95,189,896	$10,941,220	752,542,456	$85,500,675
Chicle, crude *Free*	553,787	$104,279	4,285,235	$912,688
MANUFACTURED—*Dutiable*				
Rubber soled footwear with fabric uppers *pairs*	57,458	$17,558	589,900	$158,365
Rubber toys	107,363	12,250	891,779	110,725
Druggists' sundries, n. s. s.	.....	9,832	.....	66,582
Combs, hard rubber *number*	86,184	4,947	492,326	27,743
Golf balls *number*	79,376	11,297	476,321	80,945
Tennis and other rubber balls *number*	224,375	11,916	2,892,810	139,115
Tires *number*	2,220	2,283	30,208	69,190
Other rubber manufactures	.....	29,601	.....	285,927
Totals	.....	$99,684	.....	$938,592

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	1,066,913	$130,464	18,073,431	$2,149,585
Balata	18,989	4,524	141,177	35,994
Gutta percha, rubber substitutes, and scrap	12,491	2,607	43,453	7,733
Rubber manufactures	.....	919	.....	12,691
Totals	.....	$138,514	.....	$2,206,003

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	716,028	$33,148	7,217,768	$355,035
Scrap	4,032,293	97,428	36,466,205	710,787
Rubberized automobile cloth, *sq. yd.*	50,064	22,924	368,771	189,601
Other rubberized piece goods and hospital sheeting *sq. yd.*	70,354	28,853	708,161	292,784
Footwear				
Boots *pairs*	4,442	9,337	57,017	124,013
Shoes *pairs*	7,320	4,224	123,607	61,988
Canvas shoes with rubber soles *pairs*	13,762	7,548	391,443	189,409
Soles *doz. prs.*	3,042	5,320	18,808	31,804
Heels *doz. prs.*	35,395	21,342	283,297	163,063
Soling and top lift sheets	27,222	4,567	142,907	25,809
Water bottles and fountain syringes *number*	28,063	9,595	133,120	46,862
Gloves *doz. prs.*	5,272	12,232	38,300	82,030
Other druggists' sundries	.....	43,542	.....	256,004
Balloons *gross*	15,658	14,872	155,008	138,346
Toys and balls	.....	8,269	.....	41,061
Bathing caps *doz.*	3,509	4,728	43,031	76,141
Bands	17,379	6,244	141,208	49,010
Erasers	38,334	19,740	232,196	129,353
Hard rubber goods				
Electrical goods	193,891	16,391	1,200,021	112,829
Other goods	.....	17,821	.....	132,939
Tires				
Truck and bus casings, *number*	10,007	200,294	122,043	2,204,948
Other automobile casings, *number*	66,462	620,099	500,524	4,368,170
Tubes, auto *number*	52,761	83,319	427,563	583,162
Other casings and tubes, *number*	3,236	18,976	26,879	107,329
Solid tires for automobiles and motor trucks *number*	461	12,539	3,628	102,311
Other solid tires	99,771	13,943	751,133	105,101
Tire sundries and repair materials	.....	50,467	.....	273,601
Rubber and friction tape	51,440	14,132	383,118	101,762
Belting	244,804	121,768	1,682,868	833,338
Hose	285,073	91,543	2,812,849	833,485
Packing	128,485	46,878	965,483	335,865
Thread	99,696	60,997	763,348	464,027
Other rubber manufactures	.....	138,476	.....	1,101,191
Totals	.....	$1,861,556	.....	$14,623,158

Low and High New York Spot Prices

All Prices in Cents per Pound

	November		
	1935*	1934	1933
PLANTATIONS			
No. 1 thin latex crepe	13 5/16 / 13 11/16	13 3/16 / 14 1/4	8 1/4 / 10 1/16
No. 1 ribbed smoked sheet	12 11/16 / 13 3/16	12 7/16 / 13 1/16	7 3/4 / 9 1/16
PARAS			
Upriver fine	12 / 13 1/2	9 3/4 / 10	8 / 9

*Figured to November 25, 1935.

Rubber Goods Production Statistics

TIRES AND TUBES*		1935 Aug.	1934 Aug.
Pneumatic casings			
Production	*thousands*	3,234	3,427
Shipments, total	*thousands*	3,839	4,179
Domestic	*thousands*	3,783	4,091
Stocks, end of month	*thousands*	6,322	8,436
Solid and cushion tires			
Production	*thousands*	26	18
Shipments, total	*thousands*	24	16
Domestic	*thousands*	24	15
Stocks, end of month	*thousands*	33	33
Inner tubes			
Production	*thousands*	3,154	3,570
Shipments, total	*thousands*	3,690	4,072
Domestic	*thousands*	3,647	4,003
Stocks, end of month	*thousands*	5,621	7,328
Raw material consumed			
Fabrics	*thous. of lbs.*	13,836	13,724
MISCELLANEOUS PRODUCTS			
Rubber bands, shipments	*thous. of lbs.*	287	237
Rubber-proofed fabrics, production, total	*thous. of yds.*	....	4,291
Auto fabrics	*thous. of yds.*	427	570
Raincoat fabrics	*thous. of yds.*	....	1,827
Rubber flooring, shipments	*thous. of sq. ft.*	477	413
Rubber and canvas footwear			
Production, total	*thous. of prs.*	4,698	5,161
Tennis	*thous. of prs.*	1,057	1,011
Waterproof	*thous. of prs.*	3,643	4,150
Shipments, total	*thous. of prs.*	6,132	6,529
Tennis	*thous. of prs.*	1,340	1,543
Waterproof	*thous. of prs.*	4,791	4,986
Shipments, domestic, total	*thous. of prs.*	6,106	6,448
Tennis	*thous. of prs.*	1,322	1,467
Waterproof	*thous. of prs.*	4,785	4,982
Stocks, total, end of month	*thous. of prs.*	....	18,567
Tennis	*thous. of prs.*	....	5,983
Waterproof	*thous. of prs.*	....	12,584
Rubber heels			
Production	*thous. of prs.*	....	18,605
Shipments, total	*thous. of prs.*	....	15,493
Export	*thous. of prs.*	....	339
Repair trade	*thous. of prs.*	....	4,936
Shoe manufacturers	*thous. of prs.*	....	10,218
Stocks, end of month	*thous. of prs.*	....	42,140
Rubber soles			
Production	*thous. of prs.*	....	3,601
Shipments, total	*thous. of prs.*	....	3,602
Export	*thous. of prs.*	....	2
Repair trade	*thous. of prs.*	....	382
Shoe manufacturers	*thous. of prs.*	....	3,218
Stocks, end of month	*thous. of prs.*	....	4,894
Mechanical rubber goods, shipments			
Total	*thous. of dollars*	4,354	3,923
Belting	*thous. of dollars*	1,346	984
Hose	*thous. of dollars*	1,368	1,399
Other	*thous. of dollars*	1,640	1.540

*Data for 1934 are estimated to represent approximately 97% of the industry.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

Imports by Customs Districts

	September, 1935 *Crude Rubber		September, 1934 *Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	6,428,194	$728,049	6,557,428	$859,754
New York	62,766,004	7,026,734	54,743,139	6,562,744
Philadelphia	1,339,087	149,498	892,340	116,043
Maryland	1,622,995	183,157	307,455	37,869
Mobile	1,046,393	108,263	1,206,280	133,374
New Orleans	1,212,008	124,923	1,409,598	158,048
Los Angeles	5,367,376	586,708	6,310,458	708,917
San Francisco	201,900	21,368	275,520	30,077
Totals	79,983,957	$8,928,700	71,702,218	$8,606,826

*Crude rubber including latex dry rubber content.

London Stocks, September, 1935

LONDON	Landed Tons	Delivered Tons	Stocks, September 30 1935 Tons	1934 Tons	1933 Tons
Plantation	3,270	3,646	†101,143	56,022	39,184
Other grades	....	....	55	81	53
LIVERPOOL					
Plantation	*†2,258	*1,579	*76,263	*56,848	*55,735
Total tons, London and Liverpool	5,528	5,225	177,461	112,951	94,972

*Official returns from the recognized public warehouses.
†Subject to adjustment owing to fire at Colonial Wharf.